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PROGRESSIVE MEDICINE.

A QUARTERLY DIGEST OF ADVANCES, DISCOVERIES,
AND IMPROVEMENTS

IN THE

MEDICAL AND SURGICAL SCIENCES.

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SURGERY OF THE HEAD, NECK AND THORAX—INFECTIOUS DISEASES, INCLUDING
ACUTE RHEUMATISM AND CROUPOUS PNEUMONIA—THE
DISEASES OF CHILDREN—RHINOLOGY AND
LARYNGOLOGY—OTOLOGY.



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PROGRESSIVE MEDICINE.

MARCH, 1907.

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SURGERY OF THE HEAD, NECK AND THORAX.

By CHARLES H. FRAZIER, M.D.

THE HEAD.

Early Operations in Intracranial Injuries. The writings of Phelps¹ upon intracranial injuries have always been interesting and instructive. We are indebted to him for many valuable contributions to our knowledge of this subject, which have been the result of careful and accurate observation, not the least of which is a paper recently written on the question of early operation in cases of intracranial injury. In determining the advisability of early operative intervention, basic distinction should be made between lesions as they occur above and below the dura mater. Discussion of this subject leaves out of consideration the propriety of exploring fractures of the cranial vault, which no one any longer questions. The principal epidural lesion is *hemorrhage*. According to Phelps this demands operation in such cases as do not obviously tend to spontaneous recovery, or in which a fatal issue is so imminent as to permit no question. The subdural lesions may for convenience be subdivided into meningeal and cerebral; the meningeal contusion is intermediate between the epidural and cerebral lesions. The severe cases are associated with free hemorrhage or serous effusion. Meningeal contusion not only cannot be diagnosticated from an epidural hemorrhage, but is indistinguishable from the more diffuse cerebral edema with which it is always associated. In a statistical study of some two hundred cases subjected to postmortem examination, the following observations show how difficult it is to distinguish between the subdural and pial hemorrhage. Thus loss of consciousness is common to all; its significance depends upon the time of its occurrence and its relation to the temperature. A stationary temperature but one or two degrees above normal points to an extensive hemorrhage without

¹ Annals of Surgery, December, 1906.

serious cerebral injury, whereas a constantly increasing temperature points rather to a visceral lesion. Delirium is a symptom complicating superficial cerebral injury. Variations in the size of pupils, common to all forms of intracranial injury, may accompany hemorrhages in various regions, or injuries without hemorrhage, and is therefore not a pathognomonic sign. Temperature is the most important indication of the nature of the lesion. Frequency of the pulse suggests a cerebral lesion, but the respiration often normal in both classes of injuries, is more often quickened than retarded. When the respiration is full, slow, and stertorous, it suggests superficial hemorrhages, although this is by no means a constant symptom. Focal symptoms, if present, furnish the most conclusive indication not only of the size, but of the nature of the intracranial lesion. The loss of rectal and vesical control is confined to the cases of cerebral contusions of severity, and may be regarded as pathognomonic. As a result of this comparative study it may be said that a recognized intracranial hemorrhage may be expected to be of pial origin only when associated with cerebral lesions, and will indicate operation when the cerebral lesion is regarded as of minor importance.

The most interesting portion of Phelps' article is his discussion upon the subject of the etiology of *edema of the brain* associated with these injuries. From careful observations of the postmortem findings of the mortality and of the results of operative intervention, Phelps recognizes two types of diffuse cerebral contusion; the one corresponds to that class in which there are the usual vascular disturbances, hyperemia and edema. In this class, primarily at least, the integrity of the cerebral cells is not markedly involved, although there is a tendency for their function to be mechanically destroyed. In this group, theoretically at least, operation may be indicated and may, by removal of the results of compression, modify the course of the disease. The second class is one in which from the outset there is progressive disintegration of the cellular structure, which he attributes to the primary effect of shock, that is, directly and not indirectly through vascular derangement. In this class of cases postmortem observations show that the brain may be neither markedly hyperemic, anemic, nor edematous, and there is nothing found to account for the serious results of the injury. In these cases the increased pressure may or may not be an associated lesion, and therefore operative intervention which could only be effective by relieving pressure is contra-indicated. As to indiscriminate operation, Phelps is inclined to believe "that those surgeons who operate early and often save many cases which would otherwise have soon recovered, and that those who operate later in a case which has assumed a graver character will lose some which might have recovered if the cranium had been left intact. It has been the hope of surgeons, who have been in the way of seeing many cases of intracranial injury, that operation might

be extended with advantage to those cases of cerebral traumatism, but the present state of our knowledge of the pathic conditions which obtain affords no reason for believing that this hope will be realized." This whole subject is one of tremendous importance to the surgeon. It is refreshing also to have it presented in the practical manner which Phelps has adopted, and not along the conventional lines, which classify intracranial injuries as those of concussion, contusion, and compression. As Phelps has said, the indications for the operative treatment in fractures, in epidural and subdural hemorrhage, is pretty definitely settled. The management, however, of cases of cerebral contusion is one concerning which further investigations and observations must be made before the last word can be said. Further advances may be made by continued studies in the experimental laboratory. The results of Cannon's research have done much to explain many of the symptoms associated with contusion. Many opportunities of postmortem observations are not taken advantage of. This is a source of information which surgeons have too frequently disregarded. Only by a careful comparison of the pathological conditions found either on the operating or postmortem table, with their clinical expressions, can we hope to formulate with greater accuracy indications for operation or determine with more precision the characteristic seat and extent of the injury.

Cerebral Contusion. One recognizes the difficulty in determining whether, in cases in which the symptoms are evidently not due to hemorrhage or to fracture, operation is called for. The brilliant results which sometimes follow decompressive operations encourage one to recommend operation even though there be some reasonable doubt as to the accuracy of the diagnosis; thus in a case reported by Hartwell,¹ of a young boy who had sustained a serious injury to the head by falling a distance of thirty to forty feet, there was no evidence of fracture of the vault or base. He was brought to the hospital in a condition of shock and partial coma. The coma gradually lessened, but as he began to react from the shock the coma again deepened. The reflexes were markedly exaggerated, but there were no areas of paralysis or anesthesia. Hartwell looked upon the case as one of cerebral concussion, with progressing paralysis of the cerebral vessels and beginning edema of the brain. He operated and, after uncovering the temporal region, he found the dura to be dark in color, very tense, and without pulsation. There were no evidences of extradural or subdural hemorrhage. As soon as the dura was opened cerebrospinal fluid spurted out for a distance of three to four inches, showing the pressure under which it had existed. In the course of a few minutes the pulsation of the brain gradually returned, the bloodvessels became more prominent, and the character of the blood, which before was venous, now became arterial. Coin-

¹ *Annals of Surgery*, December, 1906, p. 934.

cident with these changes, no change was noted in the character of the pulse and respiration. In the course of three to four hours, however, the patient was entirely conscious and exhibited practically no symptoms of cerebral irritation. His convalescence was uneventful. This case is therefore one in which there was a rapidly developing cerebral edema which would inevitably have proved fatal if not relieved.

While still upon this subject it will be interesting to hear what the neurologists have to say. At a meeting of the Boston Society of Psychiatry and Neurology, Sachs and Morton Prince¹ presented papers treating of the indications for operation in head injuries. Leaving out of consideration the subject of fractures of the base, Sachs believes, in deciding the question of operation, the surgeon needs the assistance of the neurologist. He takes the surgeons somewhat to task for not having taken advantage of their opportunities to advance the technique of cerebral surgery. When he maintains, in discussing the propriety of operation, that importance should only be attached to the nature, seat, and character of the brain injury, and not to whether the case is one of compression, contusion, or concussion, he is only expressing ideas which have been accepted by modern surgical thinkers. If the site of the injury is inaccessible, simple trephining may be resorted to, providing there are symptoms of increasing intracranial pressure which cannot be relieved by lumbar puncture or other simpler methods. He advises the adoption of a conservative attitude even if the injury is in an accessible region, since hemorrhages are often absorbed, and many inflammatory processes recede more or less spontaneously. In determining the gravity of brain injury the most important symptoms are the disturbance of cardiac and respiratory action, of vesical and rectal control, and the state of consciousness. Recovery from coma is encouraging, while deepening coma is of grave significance. Pupillary reflexes are of no especial significance.

Prince questions the recommendations of Sachs as to the surgeon's need for neurological assistance. As a matter of fact, in a large proportion of head injuries there are no neurological signs of a special localizing character. He goes on to say: "Dr. Sachs has laid great emphasis upon the necessity of depending upon the neurological indications for determining the necessity of surgical interference. It seems to me that there is great danger here of creating and perpetuating a neurological tradition, just as there has been a surgical tradition as to the importance of separating fractures of the base from those of other parts of the skull. We have been accustomed to hear, of late years, a good deal about the neurological indications in head injuries, the general implication, on the part of the neurologist, being that we can rely upon the neurological findings to determine both the character of the injury

¹ Boston Medical and Surgical Journal, February 15, 1906.

to the brain and its localization. These assumptions are usually meekly accepted by the surgeon as the dicta of a mysterious science. A good deal of this, I am afraid, has come to be little more than neurological cant."

In his paper he refers to the series of 146 fatal cases of *fractures of the skull* which were studied by Dwight; in only 6 of these was there a localized fissure of the vault alone. As to the unreliability of the clinical signs, it was shown that in 31 per cent. of fractures of the middle fossa itself there was no bleeding from the ear, in 29 per cent. of the cases there was not one fracture of the vault extending into or through the middle fossa, but the fracture ruptured the branches of the middle meningeal artery and death was believed to be due to cerebral compression. As showing the frequency with which serious lesions of the brain are associated with fractures, it was noted in Dwight's series that out of 138 cases, in only 22, or 14 per cent., was there no lesion of the brain. In determining the question of operation, one must take into consideration four kinds of evidence: the nature of the blow, as to whether it is likely to shock and lacerate the brain or rupture a vessel; the general symptoms, such as coma, temperature, and pulse, etc.; the neurological conditions, and the surgical evidence of injury to the skull.

In contrast to the rather conservative attitude of Phelps with reference to the surgery of intracranial lesions, Bullard¹ includes, in indications for operations in cases of head injury, any case where fracture is suspected or may exist, all cases where there are symptoms of middle meningeal hemorrhage, where unconsciousness lasts more than twelve hours, and where persistent unilateral convulsions follow the injury. When cerebral or meningeal paralysis occurs immediately after a severe injury, the question of operation must be considered. Hemiplegia or monoplegia do not absolutely indicate operation, since they may be due to hemorrhage or other injuries in parts of the brain which are out of reach. Inequality of the pupils and a slow pulse, suggesting compression, are indications in favor of operation. Immediate and persistent rise in temperature, especially if the patient is unconscious, suggests secondary encephalitis.

The Cheyne-Stokes Phenomenon in Acute Cerebral Compression. Surgeons have not paid as much attention to the possible value, in diagnosis and prognosis, to the periodic manifestations often referred to as Cheyne-Stokes respiration. This term is an unfortunate one, inasmuch as the respiratory factor is but one of four and may itself be absent. For this reason the term Cheyne-Stokes phenomenon is preferable. The complete picture includes (1) respiratory disturbances, in which regular periodicity is the principal characteristic. There are, however, two

¹ Boston Medical and Surgical Journal, February 15, 1906.

extreme types, one the gradual and the other the abrupt transition between hyperpnea and apnea, although there are many intermediate forms; (2) circulatory disturbances, manifested during hyperpnea, including increase in strength of pulse, of pulse rate, and of blood pressure. Thus blood-pressure observations, as taken with a Riva Rocci instrument, are of value only when taken in a paralyzed limb, as the increased muscular tension during hyperpnea would modify the pressure; (3) pupillary phenomena, as dilatation of the pupil just before or at the onset of the hyperpnea, and (4) variations in consciousness. There is a decrease in some cases of the profundity of unconsciousness which is associated with complex and stereotyped series of movements of the extremities. If a part of the brain is so anemic as to cause paralysis of the limbs supplied, there will be no movements of the limbs during the hyperpneic periods. This may be of immense diagnostic importance. Any one of these four factors may be absent and quite often more than one; the pupillary changes are the least and the periodic movements the most constant. After the brief review of the definition and the clinical features of this phenomenon, Trotter¹ discusses its 'diagnostic significance and pathogenesis. As to the diagnosis: as the author suggests, the surgeon has taken comparatively little interest in this condition because of its great variability. In the first place, it affords certain evidence of some compression of the brain and implication of the bulb, which if left unrelieved will surely cause death. Secondly, it may reveal the presence of a paralysis otherwise unsuspected; that is to say, if the Cheyne-Stokes movements are present and a limb does not participate in them, that limb is paralyzed. The paralysis may point in obscure cases to the seat of maximum compression. Finally, one should bear in mind the possible errors that might be made from confusing periodic movements with movements due to cortical irritation. These should be distinguishable from one another by giving attention to the following considerations: First, the Cheyne-Stokes movements occur at regular periods. Between attacks there is complete cessation of movements. Secondly, they are of wide range and complex character, and in spite of their complexity are repeated time after time with great exactitude. In one case, for example, the patient rubbed the side of his face, chest, and abdomen in that order at regular intervals for a great many hours. The limb shows signs of a mere automatic action and accommodates itself to some extent to new circumstances; this can be seen if some object is put into the hand or an attempt is made to control the movement. In rare cases one may see on one side the complex Cheyne-Stokes movements and on the other the simpler ones of a fit. Thirdly, they begin simultaneously throughout the limb and affect the arm and leg together, showing no trace of the

¹ Lancet, May 19, 1906.

ordinary march of a Jacksonian fit. Fourth, they correspond with the occurrence of the other Cheyne-Stokes factors, though the possible absence of some of these factors should be borne in mind.

The discussion of the pathogenesis involves a thorough understanding of the circulatory disturbances which have been observed in compression of the brain. (The reader is referred to *PROGRESSIVE MEDICINE*, March, 1903, p. 18, for a review of Kocher's investigations upon this subject.) After reviewing the possible theories to account for this rhythmical phenomenon, Trotter concludes with the suggestion that one method of response by the vasomotor centre to the call for increased blood pressure is a rhythmical rather than tonic activity, and that this response is a peculiarity of the individual rather than of the stimulus. He summarizes the essential features of these interesting phenomena in the following words: "First, that the Cheyne-Stokes phenomenon is in such cases no mere terminal symptom and therefore of necessarily slight interest, but one of the most characteristic forms of the vasomotor reaction, and one which may be manifest nearly from the onset of compression; second, that various modified forms of the phenomenon occur and may cause confusion, especially when the respiratory periodicity is absent; and third, that periodic movements are no less frequent and characteristic than when the phenomenon occurs in disease, and that they may be of diagnostic importance in rendering manifest a paralysis and in being movements which are to be distinguished from those due to focal irritation."

Traumatic Intracranial Hemorrhage. It is encouraging to note the revival of interest in the surgery of traumatic intracranial lesions indicated by the unusual number of contributions which have been made to the literature of this subject. This would seem to show that surgeons are not content to accept the earlier teachings and therefore are renewing their investigations with the hope of elaborating more accurate methods of diagnosis and formulating more succinct indications for operation. Murray¹ calls attention to the frequency with which intracranial hemorrhage is not recognized and the opportunity of saving life not taken advantage of. The failure on the part of the surgeon to operate in many cases is ascribed to several reasons. One of them is the extreme difficulty or impossibility of arriving at a diagnosis. A more careful inquiry into the history of the case and the character of the injury will often justify operation in these doubtful cases. Another reason is the more or less prevalent view that the probable association of cerebral contusion with subdural hemorrhage constitutes rather a contra-indication to operation. It has been shown by autopsy and operation that cerebral contusion is not as frequent a complication of subdural hemorrhage as once supposed, and it should be remembered in the first place that

¹ *Annals of Surgery*, September, 1906.

cerebral contusion is by no means a contra-indication to operation, and may be favorably affected by the removal of a large clot. The absence of focal symptoms should not be considered of itself sufficient reason for desisting from operation. The distinction which is usually made in discussing the operative indications, between epidural and subdural hemorrhage is not warranted. In the first place, it is a well-known fact that, in the majority of cases it is quite impossible to distinguish between the two; and, in the second place, the importance of removing the clot is the same whether it be epidural or subdural. As a matter of fact, both the immediate and ultimate consequences may be very much more serious when the clot is subdural. Therefore, no matter what its source may be, the presence of an intracranial hemorrhage associated with symptoms of compression should constitute a positive indication for exploratory operation. The records of the five cases reported by Murray are most instructive and bring out in a forceful way the principal points upon which he wishes to lay emphasis. One was a case of rupture of the middle meningeal artery which died three hours after admission to the hospital; the case was diagnosticated as one of cerebral contusion, but the autopsy revealed the fact that the brain was uninjured and death was due solely to epidural hemorrhage. The second case was of interest because of the unusually long lucid interval (four days) and the sudden paralysis of the respiratory centre without any previous warning and without previous disturbances. There were evidences of increasing cerebral compression in the presence of choked disk and the increase in blood pressure. The case shows that well-marked cerebral compression is possible without interference with consciousness. The autopsy revealed a large epidural blood clot in the posterior fossa measuring at its thickest portion about 1.4 cm. A small amount of blood was found beneath the dura on the right side, the occipital meninges were infiltrated with blood, and the convolutions of the right occipital lobe, posteriorly as well as on the convex surface, and of the posterior portion of the right lobe of the cerebellum were markedly flattened.

INTRACRANIAL HEMORRHAGES IN THE NEWBORN AND CHILDREN. I have often been impressed with the number of children one is called upon to see in the course of a year, who are suffering from the effects of hemorrhage secondary to accidents at birth, or in early childhood. If the child recovers from the immediate effects of the lesion it almost invariably suffers from some permanent physical disability, as a result of the disturbance in the motor cortical cells or tracts; either a hemiplegia or monoplegia, chorea or athetosis, tremors or mobile spasm. But what is of much more serious moment, it suffers, in a not insignificant number of cases, from disorders or impairment of the mind, or from epilepsy with mental defects. Of the hemorrhages of childhood it is said that 30 per cent. result in epilepsy. This is probably a conservative estimate because there are a certain number of cases, especially in very

young children, which are not recognized as such, either at the time of the acute stage or subsequently, because the patient may recover without any residual paralysis. This subject has been the theme of two papers, one by Carmichael¹ and the other by myself,² the former on the hemorrhages of the newborn, and the latter on the hemorrhages of childhood. According to Carmichael the pathological investigations of McNutt drew attention to the common occurrence of intracranial hemorrhage and its association with the clinical symptoms described by Little. Hemorrhage meningeal in origin may be cortical or basal, and when cortical is generally bilateral, and more commonly situated over the central region and toward the median line. When the hemorrhage is basal most of the children die at birth, while if cortical the children are more apt to survive, only to develop the serious mental and motor affections already alluded to. As to the predisposing causes, in about one-fifth of the cases presentation is unnatural, the head being born last, one-half of the cases are in primipara, and in other cases labor has been difficult. The lesion is not as a rule due to instrumental aid, but to the conditions which made such aid necessary. Of 14 cases of cerebral palsy of evident traumatic origin, in all except 2 labor had been long and tedious, in but 1 case was there a distinct injury to the head, while marked cyanosis had been noted in 8; 2 of the children were prematurely born, and in both there was marked asphyxia. The most probable contributory cause of intracranial hemorrhages, therefore, is prolonged cranial compression, but the most frequent exciting cause is asphyxia. Carmichael, in studying the intracranial conditions to throw some light on the etiology, concluded, from his examination of a number of fetuses, that hemorrhage followed an injury to large venous channels emptying into the longitudinal sinus near the coronal and lambdoidal sutures. The proximity of these vessels, numbering from ten to twelve, to the cranial suture suggests the possibility of their injury in displacement and overlapping of the cranial bones during parturition. In two of the skulls examined it was noted that the longitudinal sinus was not situated mesially, and that the superior cerebral veins would have to cross the suture unsupported in order to reach the sinus. Here again overriding of the parietal bones would tend to tear the vessels.

The diagnosis of hemorrhage would be suggested by the following facts: a difficult and protracted labor, signs of asphyxia at birth, bulging of the anterior fontanelle, subconjunctival and palpebral hemorrhages, edema of the eyelids, and proptosis; convulsions general or unilateral, accompanied by persistent rigidity of the limbs and inversion of the thumbs; paralysis of one or all the extremities; the presence of blood in the cerebrospinal fluid, withdrawn by lumbar puncture. These symptoms or signs should make the condition not difficult of recognition, and

¹ Scottish Med. and Surg. Jour., June, 1906. ² Trans. Am. Surg. Assoc., 1906.

even though the operation is attended with risk, the risk is insignificant as compared to the immediate danger of death or mental and physical defects if the condition is not relieved. Unfortunately the surgical aspects of the condition are not appreciated by obstetricians, and until they realize what surgical interference may accomplish the surgeon will not have opportunities of extending his sphere of usefulness to this group of cases. The indications for operation are quite as positive as in the traumatic hemorrhage of later life.

The class of cases in which I recommend operation is one in which the patients are suffering from cerebral palsies, and in one-half to two-thirds of the cases from epilepsy. From what is known of the pathology of this condition it may be said that the fundamental causes are very varied. Some of the cases are due to thrombosis or embolism, some to encephalitis complicating certain infectious diseases, but a considerable number to hemorrhage; thus in an analysis of 78 autopsies in infantile hemiplegia, Peterson and Sachs found that hemorrhage had occurred in 23 out of 35 cases. It should be remembered also that a large number of the cystic conditions may have been due to hemorrhage or embolism, and many a case of atrophy or porencephalus may belong to the same category. *Sachs is of the opinion that hemorrhages are most commonly the cause of these conditions.* Of equal importance with the hemorrhage as the cause of these palsies is the fact that, in contrast to the hemorrhages in the adult which are in the vicinity of the internal capsule, hemorrhages in childhood occur in or near the cortex. While there is cause for a good deal of speculation regarding the primary lesions, there is much more definite information about the end results. In the great majority of cases either sclerotic areas or cysts, with or without porencephalus, will be found; conditions in which the function of the brain is permanently affected because, as in sclerosis, of the existence of a definite or organic lesion, or because, as in cysts or porencephalus, of the existence of certain developmental defects. I have entered a plea for the early resort to operative intervention in the cases of hemorrhagic origin. The indications for operation in the so-called hemorrhage of childhood should be regarded quite as urgent as those after traumatic hemorrhage in later life. The importance of operating for hemorrhage promptly is not only to prevent the probable paralysis, but also to remove the clot which, when it organizes, may act as an exciting cause of a genuine epilepsy. Such a clot can do very much more damage in a child than in an adult, for not only will it act as a source of irritation, but also interfere with the development of the brain and lead to degenerative changes. I have recommended that the operation be performed some time between the first and fifth week; not later than this because of degenerative changes that invariably follow; nor earlier because some time should be allowed for the child to recover from the immediate effects of the illness, and for the attending

surgeon to confirm his diagnosis. As to the diagnosis, one would have to differentiate the palsies of cerebral from those of spinal origin. In the cerebral palsies the facial muscles are involved, convulsions are more frequent, reflexes are exaggerated, and there is usually a history at the onset of asphyxia, coma, and convulsions. The operation would consist solely in the reflection of an osteoplastic flap, which in a child could be done without any difficulty in a few moments, in exposure of the motor cortex, and removal of the clot.

Hemorrhage of the Middle Meningeal Artery. While leaning back over his car to adjust a trolley pole, a conductor lost his balance and fell to the street. He was only slightly dazed and brought on his car to the depot. He walked a short distance to the office of the railway surgeon, and the latter, finding nothing wrong, sent him home. Shortly afterward he went into deep coma; every muscle was in a state of tonic spasm, occasionally varied with clonic movements; respiration was stertorous, pulse slow, neither pupil reacted to light, the right pupil was more dilated than the left, and the right eye somewhat everted. The interval of consciousness after the injury and the later signs of extreme cerebral pressure suggested extradural hemorrhage, and Burley,¹ who was called in to see the case, advised immediate operation. A large epidural clot over an inch thick was found spread out over the whole frontal, anterior temporal, and parietal regions.

Intracranial Hemorrhage Associated with Trigeminal Nevi. Bärensprung was the first to call attention to the fact that the seat and extent of nevi corresponded to the distribution of the branches of the trigeminus, and to attribute them to some prenatal lesion in the Gasserian ganglion. Cushing² reports three cases in which, associated with cutaneous nevi, was a corresponding condition of the dura. Inasmuch as the dura receives its sensory supply from the same source, the findings in this case may be offered as further evidence in support of Bärensprung's theory. The possibility of the dural nevus leading to spontaneous hemorrhage in children is worthy of consideration.

Gunshot Wounds. The principles involved in the treatment of gunshot wounds differ radically from those laid down by the older writers. Thus, as Tilmann³ points out, the damage caused by the bullet in the living body depends, in the first place, upon the mass or substance which it sets in motion, as well as the length of the bullet track and the diameter of the bullet. One must think of the bullet track as surrounded by a number of concentric layers of tissue. The force exerted by the passage of the bullet is transmitted, through a smaller or larger radius, at right angles to the direction of the bullet wound. In other words, the damage to the brain is not the result of a direct force caused by the impact

¹ Boston Medical and Surgical Journal, October 18, 1906.

² Jour. of the Amer. Med. Assoc., July 21, 1906.

³ v. Leuthold-Gedinkschrift, Band ii, p. 247.

of the bullet as it traverses the brain, but rather the result of indirect forces set in motion by the bullet perpendicular to the bullet track. The serious brain symptoms, such as edema, are due to the effect of these indirect forces. They constitute, with the exception of the "tangent" wounds, the principal indication for operation. Inasmuch as in some cases there may be no signs of disturbance of cerebral function, immediate trephining as a routine treatment should be abandoned, reserving operation for cases in which either the symptoms demand intervention or the bullet threatens to act as a focus of irritation. In a discussion upon the subject of gunshot wounds at the XXXV Congress of the Deutschen Gesellschaft für Chirurgie, Hildebrandt emphasized the importance of taking radical steps to prevent infection, as this was the most common cause of death. Accordingly he recommended, in cases of tangential wounds, a free exposure of the region at the wound of entrance, for the purpose of removing splinters of bone, blood clots, detritus, and general disinfection. Even in the deep, perforating wounds, accompanied with serious cerebral symptoms, he thought the results were better if the skull was trephined. Perforating wounds, without serious symptoms, should be left alone. Von Bergmann took exception to these recommendations, particularly if the patient had a five or six days' journey from the scene of battle. In those cases operation should be postponed until threatening symptoms, such as meningitis or abscess, developed.

In a very excellent presentation of the subject of bullet wounds of the brain, Knaggs¹ refers to two cases under his care. Although the bullet was not found in either, both recovered and have remained free from any subsequent ill effects for a number of years. In one of the cases the patient exhibited signs of increased intracranial pressure, which were believed to be due to an abscess. The removal of a portion of the skull and division of the dura were followed by considerable bulging of the brain; the abscess was not found, but the symptoms were entirely relieved.

Fractures of the Base of the Skull. We will remind those who may be interested in the subject of fractures of the base of the skull of the Hunterian lectures which were delivered in 1904 by Rawlings.² We are indebted for a further contribution of this subject to Crandon and Wilson,³ who presented an analysis of 530 cases of fracture of the base of the skull treated at the Boston Hospital from 1864 to 1906. A review of this work will necessarily involve many statistical quotations. Of the total number of fractured skulls, 530 out of 1436 were fractures of the base. As to the etiology, 80 per cent. received an injury by falling, the remaining by assault or some other form of external violence. As to the

¹ *Lancet*, March 3, 1906.

² This article was reviewed in *PROGRESSIVE MEDICINE*, March, 1905.

³ *Annals of Surgery*, December, 1906.

relation of the loss of consciousness and the mortality, the authors conclude that it has little bearing on the prognosis. Neither the depth nor prolongation of primary unconsciousness seemed to be in itself a measure of danger; 74 per cent., or 395 of the total number of cases, had hemorrhage, either from the nose, ears, or mouth. In practically all the cases in which a careful aural examination was noted, the drum was found to be ruptured. There was a very high mortality in those cases in which there was pharyngeal hemorrhage, since it indicated a fracture approximating the median line, and one which must have been due to great force. The autopsy in these cases showed that the fissure had passed through the pituitary fossa and torn the mucoperiosteum of the under surface of the body of the sphenoid. Subconjunctival hemorrhage is only indicative of an injury to the roof or outer wall of the orbit. The rapidity of the pulse seemed to be of little importance, the quality being of greater importance; 106 out of 117 cases with stertorous breathing died. Most of the cases had normal temperature. Of those who had a high initial temperature, nearly all died. Their observations upon the temperature agreed with those of Phelps, namely, that an early rapid progress in the temperature suggests serious cerebral contusion. No very valuable information was gathered from observation of the pupils.

Paralyses of the bladder and rectum are of little value in diagnosis or prognosis. They must be regarded simply as an associated symptom of the unconscious state, whether due to hemorrhage or contusion. Other things being equal, increased or diminished knee-jerks seem to be present in those cases the majority of which terminated fatally. Only 59 of the whole series were operated upon, and of those 31, or 53 per cent., died. As to the immediate prognosis, when death occurs within a short time after the accident, it was due to laceration of the brain and attending hemorrhage. The most critical period was during the first forty-eight hours. The authors made an attempt to study especially the after-effects of these injuries in order to throw some light upon the remote prognosis. Unfortunately they were able to get information from only 38 cases. The following table contains a list of the sequels:

	Yes.	No.
Headache	13	25
Eye troubles	17	21
Dizziness	15	23
Deafness	16	22
Paralysis	1	37
Fainting spells	4	34
Fits.	2	36
Loss of memory	4	34
Troubled by sunlight.	13	25
More easily crazed by alcohol	6	32
Worked since injury	15	23
Same work since injury	21	17

One of the most important points to which attention is drawn by the authors is the positive risk of not enforcing rest for a reasonable and rational period of time. They quote 8 cases, in which following a very brief course of treatment at the hospital patients were allowed to leave, and suddenly died, either a few hours or a few days afterward. Inasmuch as these fractures are liable to mobility and consequent injury of delicate adjacent parts, they should be treated as carefully as fractures of any other bones, and, according to the authors, the patient should remain in bed at rest for at least three full weeks, should be kept as quiet as possible, with but few visitors, and have nothing to attract his attention or to cause any excitement. His food should be taken lying down, and cathartics should be used freely.

While considering the question of intracranial injuries and fractures involving the base, mention might be made of a case which came under the care of Brewster and Walton.¹ The patient had been struck by a bridge while riding on a rapidly moving train. There was immediate unconsciousness, then a period of improvement, followed by a deepening unconsciousness and slowing pulse, but no localizing symptoms of pressure. The case seemed a hopeless one. An exploratory operation meantime revealed a large clot, the result of an intradural hemorrhage, which at the time of operation was so profuse as to threaten life. It seemed to come from the base, and was finally controlled by packing. From the surgical point of view the case is instructive because it serves as an argument for those who advocate operative intervention in the absence of evidence of fracture or extradural hemorrhage and in the presence of an apparently hopeless brain lesion. The patient rapidly recovered from the effects of the injury. There were, however, features of neurological interest, especially as illustrating the distinction between the various speech centres. It was evident in this case that the mind vision centre, the writing centre, and probably Broca's centre, with their connections, were comparatively intact, and that the injury fell chiefly upon the centre for auditory memories in the temporal lobe, with its afferent and efferent fibers. The peculiar abnormalities in speech in these cases also favor the view of Bastian that there is a chirokinesthetic centre (denied by Dejerney) which acts independently of Broca's centre.

The Late Results of Complicated Fracture of the Skull. Whether attempts should be made after fracture of the skull to replace the fragments and to repair the defect has long been a disputed point, more especially with reference to the development of certain sequels, such as epilepsy. Two schools are arrayed against each other. Kocher may be said to represent and be the advocate of that school which contends that complications are more apt to follow when the opening in

¹ Boston Medical and Surgical Journal, May 31, 1906.

the skull is closed than when it is left open. His opinion, according to Brewitt,¹ was based upon observations of only 13 cases, and only 5 of the 13 remained entirely well. On the other hand, von Bergmann found 4 epileptics and 2 incapacitated out of 11 cases in which the defect in the skull was allowed to remain. In order to throw some further light upon the situation, Brewitt has reviewed the subsequent histories of a series of cases which were treated in the Urbanstrasse Hospital in Berlin, from 1890 to 1905. Only those were included in the series in which there was a wound of the scalp and an opening in the skull; subcutaneous and depressed fractures were excluded. As to the location of the fracture, 32 were in the parietal region, 2 in the occipital, and 10 in the frontal. In only 30 was there any injury to the brain or meninges. The author was of the opinion that the sooner the defect in the bone was healed the better for the patient. He treated his cases accordingly. In 38 of the total number, the opening in the skull was closed by reimplantation of the fragments, and of these 24 entirely recovered, 2 with some slight disturbance, 2 were unable to earn their living, 2 died, and 8 disappeared. In 4 cases the defect was closed by a secondary plastic operation; 3 of them entirely recovered and 1 was cured of epileptic seizures to which he was subject. In 30 it was necessary, for one reason or another, to allow the wound to heal by granulation so that there remained a persistent opening in the skull. Of this group only 9 recovered, 2 had some slight disturbance, but were incapable of active service or employment, 1 developed epilepsy, 8 died from the results of the wound, and 9 disappeared. Of the latter all seemed well when they were discharged. From his own experience, as compared with that of other observers, he still holds to the view that it is better to restore as far as possible the covering and protection to the brain which nature provided. Any argument not based upon the clinical observations must be entirely theoretical. We cannot speak dogmatically upon this subject until physiological investigations have been made to determine what changes if any take place in the brain tissue when its bony envelope is removed and when it is subjected to a number of influences which do not prevail under normal conditions.

Traumatic Aphasia. Pochhammer reports a case in which during the course of the convalescence the character of the aphasia changed from a pure motor aphasia to one simulating sensory aphasia, and this, too, in spite of the fact that the injury was confined to the third frontal convolution. There was found, at operation, an epidural abscess and a circumscribed area of softening. Pochhammer² commented upon these peculiar phenomena. He concluded that perhaps only a small

¹ Arch. f. klin. Chir., Band lxxix, Heft 1.

² Mitt. a. d. Grenzgeb. Med. u. Chir., Band xv, Nr. 5

portion of the symptoms which are usually included in the clinical picture of sensory aphasia have anything to do with the region of the temporal lobe, and that too much importance should not be attached to the usual differentiation of the sensory centre of speech.

Traumatic Cortical Blindness. De Beck reports findings which were interesting both to the surgeon and to the ophthalmologist. Following a blow in the parietal region, the patient became unconscious and remained in that state for three days. Upon recovering consciousness on the fourth day he was found to be blind. An ophthalmic examination on the sixth day, which was made by de Beck,¹ revealed a marked optic neuritis, more pronounced on the side opposite that of the injury. A large blood clot was found spread over the parietal and occipital region, and its removal was followed by a rapid subsidence of the choked disk and complete restoration of vision.

Bradycardia following Head Injury. The persistence of an exceedingly slow pulse for a period of ten days following a head injury was noted in a case coming under the observation of Willard.² The patient had been struck on the head by a brick, and shortly after his admission to the hospital had a slight convulsion, in which the face became cyanotic. For several days the patient was dazed and slightly delirious, but there were no evidences of fracture or focal lesions. At the first observation his pulse was 56, but it fell steadily without diminution in volume, until, on the second day, it reached 28, and on the seventh day 23, and continued in the twenties until the time of the report, which was ten days after the accident. The respirations varied from 12 to 20 and the temperature was subnormal. The cause of the cardiac inhibition was not determined.

Elephantiasis of the Scalp. Attention was called one year ago to a case of elephantiasis of the scalp which was seen by Macdonald³ in Zanzibar. Although this condition is very rare, a similar case has since been reported by Saar.⁴ The growth was attributed to the effects of traumatism, the patient while a boy having sustained repeated injuries to the affected region. The mass, measuring 13.5 cm. long and 4 cm. to 5 cm. in width and thickness, proved, upon microscopic study, to be a benign lesion having the usual characteristics of elephantiasis arabum, with the exception that the bloodvessels were not dilated. This condition of the bloodvessels is regarded by the author as a terminal stage of the process, associated with overgrowth of connective tissue and narrowing of the bloodvessels.

ELEPHANTIASIS NERVORUM OF THE SCALP. The most constant manifestation of this disease is certain skin changes which consist

¹ As reported at the thirteenth annual meeting of the Washington State Medical Society, Tacoma, Washington.

² *Annals of Surgery*, March, 1906, p. 456. ³ *PROGRESSIVE MEDICINE*, March, 1906.

⁴ *Arch. f. klin. Chir.*, Band lxxviii, Heft 4.

of patches or points of pigmentation of superficial tumors (molluscum fibrosum) and at times of large, diffuse growths. There may be multiple tumors, associated with a single nerve or involving an entire plexus. The neuromas are palpable under the skin, but do not interrupt nerve impulses unless they arise from the nerves within the brain or cord. In the case recorded by Helmholtz and Cushing,¹ in addition to the common features of the disease, the patient possessed an unsightly tumor springing from the side of the head, a common site for these tumors. The tumor began at the age of eight, followed a blow sustained one year previously, and in the next four years grew so rapidly as to cover part of the left cheek; the ear stood at right angles to the head. For the past seven years the growth has been slower; there has been no pain nor sensory disturbances. At the operation several nodules over the course of the auriculotemporal branch of the fifth nerve were discovered and removed. The tumor was soft and elastic, and of a dull-gray color; the surrounding tissue was readily stripped from its capsule, leaving a smooth, glistening surface. The nerve trunk, proximal to the neurofibroma, was uniformly thickened as far as it had been removed, while the distal portion was of smaller calibre. Microscopically, the neurofibroma was found to be composed of loose connective tissue, the greatest part of the tumor being due to proliferation of the perineural connective tissue and endoneuron. The article is well illustrated and contains a complete review of the literature of the subject.

Cornu Cutaneum of the Human Scalp. Horns of the human scalp are usually single, non-uniform in size and shape, occur in this location in about one-half of all cases, and can be divided into sebaceous, warty, cicatrix, and nail horns. Roberts reports a case in which the horn grew from a wart in the cheek of a woman seventy-five years of age. Numerous other cases have been observed, which seem to indicate that some previously existing lesion must be regarded as an etiological factor. Among the exciting factors are included blows or anything which excites cell proliferation. Primarily the horns themselves are benign, but in some instances they are the precursor of carcinomatous changes. Neitert and Bahler² describe two cutaneous horns, developing from sebaceous cysts which had been subjected to traumatism.

Passive Hyperemia for Inflammation of the Head. For several years Bier has used passive hyperemia, almost exclusively, in the treatment of inflammations and suppurations about the head or face. The congestion is produced by a rubber bandage, two to three centimeters in width, which is allowed to remain around the neck uninterruptedly for a period of twenty to twenty-two hours. If this treatment gives rise to considerable edema, the bandage is removed temporarily for one hour, and as the case improves the period of treatment is gradually

¹ Amer. Jour. Med. Sci., September, 1906.

² Annals of Surgery, June, 1906.

diminished to ten to twelve hours per day. The influence of the congestion on pain and suppuration was as striking as when applied to the extremities; pain soon ceased and suppuration rapidly subsided; the pus either was transformed into serous secretion or rapidly absorbed. According to Keppler¹ splendid results were obtained in erysipelas, parotitis, acute dacryocystitis, suppuration of the maxillary bones, middle-ear disease, and even in a case of leptomeningitis of aural origin.

Cholesteatoma of the Skull. True cholesteatoma of the skull must be classified as a surgical rarity. In no instance has recurrence followed the extirpation of the growth. In three instances the tumor was situated in the frontal and once each in the parietal and occipital bones. In Unterberger's² case the temporal region was affected; the patient, a sixteen-year-old girl, gave the history of a tumor over the left eye which grew gradually toward the temporal region, producing headache of moderate severity and some loss of weight. The tumor projected one and one-half centimeters from the surface of the skull, the skin was normal, the consistency of the growth hard, and its surface smooth and regular. A portion of the growth occupied the orbit, but did not cause any disturbance of vision. The orbital portion of the tumor was exposed by dividing and raising the periosteum at the outer margin of the orbit, by chiselling through the frontal process of the zygoma and the lateral wall of the orbital cavity. The wall of the tumor consisted of squamous epithelium, arranged in multiple layers; there were no papillæ, glands, or hair. For a discussion of the derivation of these tumors see PROGRESSIVE MEDICINE, March, 1906.

Closure of Cranial Defects. There are various methods for repairing defects in the skull: thus, the Macewen, in which broken and splintered pieces of bone are implanted into the defect; the König-Müller method, which consists in reflecting a bony flap composed of the outer table of the skull and periosteum; the method of Hacker, which consists in reflecting the periosteum alone, and, lastly, the method which employs some foreign substance, celluloid being the material most commonly used. Blecher³ discusses the relative merits of these various methods. He believes the indications for the use of one or the other of these methods depends upon the condition, character of the wound, and upon whether or not the defect can be immediately repaired. In cases in which the wound is not infected, and can be immediately closed, the Macewen method is regarded as the most satisfactory. This also may be said to be applicable in those cases in which the dura has not been seriously injured. The success of the Macewen method depends very largely upon the vitality of the dura, inasmuch as this membrane actively participates in the regeneration

¹ Münch. med. Woch., 1905, 45-57.

² Deut. Zeit. f. Chir., Band lxxxii, Heft 1.

³ Deut. Zeit. f. Chir., Band lxxxii, Heft 1-3, 1906.

of bone. If the dura has been so injured as to render it incapable of performing this function, the Macewen method will fail. The König-Müller method is applicable both to those cases in which the defect is closed immediately as well as to those cases in which the closure must be deferred to some subsequent time. There is an objection which might be raised to both methods, as well as to that of Hacker, namely, the likelihood of the formation of adhesions between the dura and the regenerated bony covering. These adhesions may result in some subsequent disturbance, such as epilepsy.

Celluloid seems to be the most suitable material for closing defects in the skull. It has been used to advantage also in cases where there was a tendency to hernia or fungus cerebri. As has been shown by experience, it does not undergo any change even after it has been in the wound a number of years; it is inexpensive and non-irritating. There are several ways in which the plate may be secured in place. By some a groove is chiselled out between the diploë and the outer table, into which the plate is inserted. This is rather complicated, and is useful only in small defects with even edges. Others again cut the plate a little larger than the size of the defect and slip the edges in between the bone and pericranium. It is most important, however, that at the time the plate is inserted the wound should be dry and free from infection. If hemorrhage is not entirely controlled, blood will accumulate beneath the plate and may give rise to serious disturbances. It has been suggested that the plate be perforated in order to allow the escape of blood, but this would allow of granulations growing in through the openings and forming adhesions between the plate and the dura. Inasmuch as it is difficult to absolutely control hemorrhage at the primary operations, it is a better plan to put off the insertion of the plate until the wound is entirely healed. Blecher,¹ who gives an account of a number of cases in which this operation has been performed with benefit to the patient, is in the habit of softening the material by dipping it in hot water just before its insertion, so that it may be cut to fit accurately the edges of the defect.

As an alternate to one or the other ways of closing defects Beck suggested the use of a flap composed of the temporal fascia, muscle, and pericranium. This method is useful only in those cases in which the defect is adjacent to the temporal muscle. A flap of proper dimensions is reflected so that the temporal fascia is on the inside and the pericranium on the outside. In the case in which this method was applied the flap was sutured to the edges of the dura. The new base formed from the periosteum will repair the defect, but the interposition of the temporal fascia will prevent the formation of adhesions between the flap and the cortex. This is an important consideration when operating

¹ Loc. cit.

for the relief or prevention of epilepsy. Beck believes there is no tendency for dense fascia, as the temporal fascia, to become adherent to the brain.

Methods of Controlling Hemorrhage in Operations upon the Head.

From a very extensive and varied operative experience, Crile¹ has come to place the most reliance, as a means of controlling hemorrhage, upon the conjoint use of temporary closure of the common carotid or external carotid, of the head-up posture, and of the use of the pneumatic suit. The head-up posture used alone is a dangerous one, because of the possible cerebral anemia. This, however, is thoroughly controlled by the use of the pneumatic suit. Temporary closure of the artery is to be preferred to permanent ligation, because the ligature shows that the latter operation has been attended with a mortality of from 2 to 3 per cent. from cerebral embolism alone. In controlling hemorrhage from the scalp he uses a very ingenious method and one which is said to be efficient: instead of an elastic tourniquet he uses a double layer of rubber dam, which, if applied snugly upon the entire scalp, will render it completely bloodless. In his work upon the Gasserian ganglion he has elaborated a technique which enables him to keep in view the ganglion from beginning to end. The preliminary procedures consist in hypodermic injection of morphine and atropine, the application of the rubber suit, the elevation of the patient to an angle of forty-five degrees, the application of a temporary clamp to the common carotid artery, and the use of the rubber turban. These procedures will control hemorrhage from the scalp, brain, and dura. There remains to be considered venous hemorrhage, which, after all, is the more troublesome. This he has been able to control satisfactorily, by the use of little retractors made of wire loops, and formed like tongue retractors, with slender handles bent at right angles. These retractors are used to exert pressure upon a small roll of gauze. By applying three or four of these compresses and securing them in place with wire retractors, he has been able to keep the field of operation perfectly dry.

Craniometric Lines and Craniocerebral Relations. From frequent observations on both the living subject and upon the cadaver, I have been surprised to find how frequently the craniometric lines correspond to the fissures and convolutions of the brain. In my clinic at the University Hospital the Anderson-Makin lines have been used exclusively in determining the shape and position of a flap to be used at each operation. In order to determine how accurately the position of the flap corresponded to the region of the brain which it was intended to expose, a number of observations were made upon the cadaver.² At first thought it might appear impracticable if not impossible to outline upon the scalp a flap which would correspond to a given area of the brain,

Annals of Surgery, December, 1906.

² University of Pennsylvania Medical Bulletin, April-May, 1906.

but in my observations upon the cadaver the physiological areas which I anticipated exposing were found almost invariably in the opening made upon reflecting the flap. My conclusions corresponded with those at which Froriep had arrived in his investigations of the relations between the brain and the skull. Froriep found that the absolute length of the skull could be considered a factor, which took into consideration variations in the shape of the brain and its relation to the skull, and further that, based upon familiar craniometric methods, there was a variation in the position of the fissure of Rolando or Sylvius of not more than 35 to 40 mm., between the most extreme types of brain, the frontopetal and occipital types. The calculations in the Anderson-Makin method, which I have used exclusively, are based upon the length of the skull measured from the glabella to the inion.

The Operability of Cerebral Tumors. Despite the fact that there is an effort on the part of some to throw a wet blanket over surgical endeavor, directed to the treatment of brain tumors, there seems to be from all sides evidences of growing interest in this engrossing field. At least so one would judge from the number and character of the contributions which are brought to our attention each year. In addition to the interesting articles from other sources, I want to call attention especially to one of English authorship, the Address on Surgery delivered at the meeting of the British Medical Association (1906) by Sir Victor Horsley.¹ This address is devoted to the field of neurological surgery, and is one of the most substantial contributions that have been made for a number of years. Based as it is upon the distinguished author's experience covering a period of twenty years it contains material of the most inestimable worth. I will take occasion, in my review of this subject, to quote it extensively. Special mention should also be made of an article containing his experience in intracranial surgery by Mr. Charles A. Ballance,² of London, whose work and experience in the surgery of the nervous system are so well known, and another by Krause³ who has written an article reviewing the surgical treatment of diseases of the brain.

As to the operability of brain tumors conflicting views are expressed from time to time. Many of these, however, are based upon postmortem observations. Thus, for instance, in a study by Walton and Paul⁴ of the postmortem and clinical records of 424 cases, they class 7 per cent. as operable, 80 per cent. as inoperable, and 13 per cent. as doubtful. This, however, is a very misleading way of estimating the operability of tumors, since at the autopsy table the size and relations of the tumors may differ very radically from that at the time when operation may have been undertaken. In speaking upon this very point, Horsley says: "Post-

¹ British Medical Journal, August 25, 1906.

² Transactions of the American Surgical Association, 1906.

³ Deut. med. Woch., November 23, 1906.

⁴ Journal of Nervous and Mental Disease, August, 1906.

mortem records can never teach what the careful study of the living tumors exposed in an operation can demonstrate, since in almost every case the former condition is practically what we may term inoperable." The term operable tumor should, I think, be restricted to those cases in which the tumor is accessible, and of such a character as to enable it to be removed without undue risk to the patient's life. In this category, therefore, would be included tumors situated on the cortex or immediately beneath the cortex, tumors taking their origin from the dura, from the meninges, and tumors that are not of the infiltrating type. If a tumor is found to be very vascular and of the infiltrating type, I am quite sure that no attempt whatsoever should be made to extirpate it. The attending hemorrhage may prove fatal, and if the patient survive the operation and the tumor has been but imperfectly removed, the rate of growth will be very much more rapid than prior to the operative interference. Too much stress cannot be laid upon the importance of diagnosis, in order, as Horsley says, that the earliest commencement of a tumor of the brain may be determined as certainly as that of one nearer the surface of the body. As to the time of operation, the day has passed when surgical treatment should be regarded as the *dernier ressort*. When the symptoms point to the existence of a gross organic lesion of the brain and cure has not been effected by an energetically applied course of medicinal treatment for a period not longer than six or eight weeks, as in cases of suspected syphilis, operation should be resorted to.

PALLIATIVE OPERATIONS. There are two surgical procedures which may be adopted in the treatment of brain tumors, the palliative and the curative. We will take up first the palliative operation, because it has attracted of late more attention and because with our present knowledge it is applicable to the majority of cases. It is difficult to express in figures the percentage of cases in which this operation may be indicated, but a reasonable estimate places it at 80 per cent. of all brain tumors. The subject of palliative operations is exhaustively treated in an article on "Cerebral Decompression," by Spiller and myself.¹ The article begins with a review by Spiller, who traces the history of this interesting subject from the first recorded published reference to the present time. As a result of his experience in the study of the literature, Spiller concludes that a palliative operation should be performed early in every case in which symptoms of brain tumor are pronounced and before optic neuritis has advanced far, especially where syphilis is improbable or antisiphilitic treatment has been employed. He takes exception to the statement of Horsley that palliative operations may cause atrophy of the brain tumor. He has never seen any such result in any of his cases. Horsley, on the other hand, claims that there remains some possibility of the tumor undergoing retrogression in a certain number of cases. Palliative

¹ Journal of the American Medical Association, September 1, 8, 15, and 22, 1906.

operation is not to take the place of a radical operation when the latter can be performed without great risk to the patient. In some cases the symptoms of brain tumor disappear almost entirely for a long time or permanently after a palliative operation. This result he believes is obtained either by relief of intracranial pressure or by removal of some lesion (meningitis serosa, etc.) other than brain tumor, and yet causing the symptoms of tumor. Horsley speaks very emphatically upon the indications for operative intervention, particularly with reference to optic neuritis. He says: "It is now possible to dogmatize on this question, and to say that in no case of optic neuritis (not, of course, of toxic or anemic origin) should the process be allowed to continue after it had once been diagnosed, and that if blindness results therefrom the responsibility is very heavy on anyone who fails to advise such a simple proceeding as opening the dura mater. As to the localizing value of the incidence of the optic neuritis, although varying statements have been made upon the subject, some believing that it begins on the side of the lesion and some on the other side, he has come to the conclusion, from an examination of his own cases of intracranial tumor, that optic neuritis commences on the side of the lesion. In my paper with Dr. Spiller I recommended, in the case of cerebellar tumors, a vertical muscle-splitting incision instead of the curvilinear incision, which is usually made when we explore the cerebellar hemispheres. With the vertical incision the edges of the wound can be retracted sufficiently to afford the space necessary to carry on the subsequent steps of the operation. While it enables one to remove the bone only from over one hemisphere, if a bilateral craniectomy seems advisable, the same operation may be repeated on the opposite side. It is important to leave a bridge of bone between the two sides, as there will be less chance of disturbance arising from traction upon the pons or medulla. I have in previous communications alluded to exploratory operations upon the cerebellar hemispheres in which a third of a hemisphere has been removed; while no unfavorable results have followed this procedure, I would not be understood to recommend it in all cases, but only those in which there seemed to be some difficulty in securing a proper exposure of the cerebellopontile angle. In palliative operations for tumors of the cerebrum, as Sanger and Horsley suggest, preference should be given to that portion of the skull beneath which may be said to exist the silent area of the brain. This is especially true of the right temporal region, so that, in the absence of any contra-indication, this may be said to be the region of choice. One should be content to make but one opening at least at the first sitting, as this will be found in most cases sufficient to afford the necessary relief of pressure. Should there be any recurrence, an opening may be made on the opposite side. There are cases in which it is impossible to determine prior to the operation whether the tumor is one appropriate for a radical rather than a palliative operation. In such cases one should begin the operation with the intention first

of attempting to expose the tumor. An osteoplastic flap is reflected and the usual exploratory measures adopted. Finding the tumor an inoperable one, we may then remove the bone from the flap before it is replaced, or close the osteoplastic flap and remove the bone from the area of choice, namely, over the right temporal lobe. The propriety or necessity of opening the dura in addition to removing the bone is one which has given rise to some discussion. Horsley says as a rule it is necessary to make a free opening of the dura mater to effect this purpose.

We have had in our series cases in which the desirable results were obtained even though the dura was left intact, and less satisfactory results in some cases in which the dura was freely opened.

Spiller's experience with the decompressive operation includes a series of 14 cases, 12 of which were operated on at the University Hospital, 11 by myself and 1 by Martin. The absence of any fatalities in the series is worthy of note, when one is debating as to the advisability in a given case of performing a radical or a palliative operation. Consideration should be given to the fact that there is at least no immediate risk as to life from the decompressive operation. As to the results in this series the choked disk subsided in every instance; unfortunately in at least 3 of the cases the patients remained totally and hopelessly blind because of the then existing optic atrophy. The subsidence of the choked disk took place as rapidly when the dura was left intact as when it was incised. With respect to headaches, the results were uniformly good. There were two or three cases in which the headaches did not entirely cease, but in these there were intervals of relief and the headaches were less severe. As to the duration of the period of relief, the longest is now more than three years. In 2 of the cases nature had already begun to relieve the intracranial tension, as the tumor was found growing through the dura and in one instance had almost perforated the skull.

CURATIVE SURGICAL PROCEDURES. When considering the removal of the growth we should consider, according to Horsley, (1) what is the nature of the disease; (2) what loss or aberration of nerve force it causes; (3) whether, if the lesion be wholly extirpated, there will be a recovery from the disorder of function, and (4) whether any ills which may have been present before operation will be made permanent by the necessary extirpation of particular regions of the brain.

The possible compensation of function when various points of the cerebrum or cerebellum have been destroyed may be considered as follows: First, as regards the cerebrum, the special motor function cannot be restored if the whole of their cortical representation has been removed. The same is probably true of the special senses, and certainly of hemianopic representation of sight. The higher sensory representation and the intellectual functions are not permanently abrogated by the destruction of any one part of a cerebral hemisphere. Horsley

does not speak so positively of the cerebellum. He disapproves on general principles of the unnecessary mutilation of the cerebellum (referring to my proposal to extirpate a portion of the lateral lobe for the purpose of reaching deep-seated tumors) on the grounds that his own experience is against such a practice. As an illustration of the possible restoration of function or of compensation he cites a case in which the tissues had been only bruised or compressed by the pressure of a tumor. Eleven years have elapsed since the tumor was removed and the only indication of loss of function is a slight unsteadiness of the hand when the patient is fatigued. While agreeing in general with all that Horsley has to say about the undesirability of unnecessary mutilation of the structures, a principle applicable to all surgical procedures, I may refer to a patient from whom a third of one cerebellar hemisphere was removed several years ago; the patient is still alive and so far as I have been able to determine there are no demonstrable disturbances of function. How the function of the removed portion has been compensated for no one can tell.

I should like to refer to some points alluded to by Mr. Charles A. Ballance,¹ in relating his experience with intracranial lesions. In connection with the general discussion of brain tumors, of especial interest was his reference to cases with symptoms of cerebral tumors which may recover without operation, with operation when no tumor is found, or die and no tumor is found at autopsy. He cites the history of one case, with every symptom pointing to a cerebellar lesion, where the operation failed to find any, but entirely recovered and is well two and a half years after the operation. He emphasizes the fact that a highly cellular tumor of the brain is not necessarily very malignant; this is also true of tumors elsewhere. As to localizing signs, he speaks of fine vibratory tremors of the homolateral limbs and the absence of epigastric and abdominal reflexes in the contralateral side, in tumors of the frontal lobe; of the value of hemianopsia, of mental change, and of deafness as important diagnostic signs, when they are the first of the symptoms to suggest brain tumors.

An interesting subject relative to tumors of the brain is their not infrequent presence in the *insane*. Tumors may give rise to mental symptoms, or may originate in the brains of those insane from other causes. A considerable number of brain tumors in insane people has been collected by Beadles. Two points of practical consideration as to the technique are referred to: one, the desirability of lumbar puncture as facilitating exploration, by relaxing pressure (unfortunately a dangerous procedure); the other, the importance in occipital operations of making the dural flap so that its base is toward the anterior margin of the wound, where it will receive an adequate blood supply from the middle meningeal artery.

¹ Trans. Amer. Surg. Assoc., 1906.

TECHNIQUE OF OPERATIONS. *The Anesthetic.* Horsley prefers chloroform to ether anesthesia; the latter increases blood pressure and blood venosity and therefore causes troublesome hemorrhage, and in its later effects causes headache and excitement; while chloroform is more dangerous than ether, it causes a fall of blood pressure, with relatively less venosity, and therefore does not aggravate bleeding or embarrass respiration by causing bronchorrhea. He has abandoned the use of morphine because of its depressant effect on the respiratory centre. Inasmuch as chloroform kills often by respiratory failure he recognizes the danger of its use in patients who, because of already existing increased intracranial tension, are liable to die at any moment from sudden paralysis of the respiratory centre. Chloroform must be used with greatest caution and Horsley has adopted a scheme whereby a minimum amount will be used. He found that but 2 per cent. of the vapor is required for about five minutes before the incision in the skin. After this the dose can be lowered to 1 per cent., increasing it again when the dura is incised. In the manipulation upon the encephalon the dose may be reduced five-tenths or even cut off altogether, not to be raised again until the sutures are introduced. The body temperature should be maintained generally as well as locally; for the latter the surface of brain exposed is irrigated with hot saline solution.

Hemorrhage. Tamponing or permanent closure of the artery should be avoided wherever possible; in one case it was followed by fatal secondary edema and softening. Hemorrhage should be controlled by preliminary ligation of the arteries around the lesion before extirpating it. In the smaller vessels hot irrigation with a solution at a temperature of 110° to 115° F. is very much more efficient and safe than a tampon. Temporary anemia may be induced if desired by increasing the percentage of chloroform (1 to 2 per cent. for a quarter to half a minute). Venous hemorrhage he controls by ligation or hot-water douches, according to the size of the vessel, and by inhalation of oxygen. The latter relieves the asphyxia which is responsible for much of the venous bleeding.

Edema Cerebri. When the skull is opened there is a tendency for the brain to become edematous; this is due probably to unrelieved pressure. Thus of 13 cases which died of shock after the second stage, in 7, by reason of failure of diagnosis, the pressure was not relieved directly over the seat of the lesion, whereas in 6 cases in which a tumor of the brain was diagnosed and correctly localized, but in which removal was not attempted, owing to the size of the growth and other reasons, no patient died. The conclusion to be drawn from this is that the risk of a decompressive operation is greater if the opening for the relief of pressure is not made directly over the tumor. (See section on Palliative Operations, page 38.)

The same point is illustrated by comparing the results of all tumors accurately with those inaccurately localized. The mortality in

the former class was 8 per cent. as compared with 35 per cent. in the latter.

TREATMENT OF SHOCK IN BRAIN OPERATIONS. The treatment of shock must be managed according to the symptoms which threaten life, according as they affect the respiration, the circulation, or the body temperature. Horsley recommends for respiratory embarrassment inhalations of oxygen until the effect of nutritive enemata begin to make themselves felt. For depression of the respiratory centre strychnine is most valuable. As a stimulant of the bulbospinal centres, strychnine is unrivalled and is clearly indicated when any marked alteration of the rhythm shows itself. It is of no value, however, when given previous to operation with the idea of preventing shock. For the circulatory symptoms bandaging the extremities may be resorted to, but no drug should be given with the idea of accelerating the heart. The heart does not need accelerating, Horsley says, but feeding; therefore repeated enemata made up of four ounces of beef-tea and pancreatized milk should be given. A very small dose of atropine is useful, and, for vasomotor paralysis, digitalis. Alcohol is a depressant and should be avoided. In a large majority of cases, particularly in children, one of the shock effects is loss of control of body temperature, and the latter instead of falling may rapidly rise to a dangerous degree. Hyperpyrexia of this nature may be controlled by cold sponging of the upper limbs.

Sepsis. The most frequent cause of death next to shock is sepsis. In Horsley's series during the past twenty years there were 17 patients who died from sepsis. To avoid infection he recommends continuous irrigation with a weak mercurial solution during the operation, dressings of mercurial gauze to be frequently changed, vigorous disinfection of the skin, and as little drainage as possible. So long as the cerebrospinal fluid continues to flow there is always the danger of septic invasion.

DISPLACEMENT OF THE BRAIN. When considering displacement of the brain for exposure of the structures at the base of the brain, Horsley reminds us that the hemisphere is anchored to the dura mater by emissary veins at various points: (1) in the mesial plane to the longitudinal sinus; (2) laterally, chiefly by the temporosphenoidal vein to the lateral sinus; (3) to a less degree by the external occipital vein, and (4) by the anterior temporosphenoidal vein. To facilitate the elevation of any region some of the veins must be ligatured. Every precaution should be taken not to contuse the brain tissue with the retractor. By elevating the temporal lobe Horsley has been able to see the crura cerebri, the circle of Willis, the pituitary body, the internal carotid, and the second and third cranial nerves. In 2 cases operated on for the removal of a pituitary tumor he has inspected the base of the brain further by means of a rhinoscopic mirror placed in the sella turcica.

RESULTS OF THE OPERATION FOR BRAIN TUMORS. The result of Horsley's¹ series of 55 cases of brain tumor are given in the accompanying table:

	Cases.	
Glioma	19	} 23 Recurrence within two years, 20.
Sarcoma	4	
Endothelium	8	{ 1 recurrence three years later; died of valvular heart disease. 7 alive and well, longest five years.
Tuberculous	4	
Gumma	8	{ 2 died within three months of tuberculous meningitis. 2 alive and well, longest seven years.
Fibroma	4	
Cysts	5	{ No recurrence.
Adenoma	3	
Adenosarcoma } (pituitary)	3	1 recurrence.

The difficulty of dealing with malignant tumors arises from the fact that they not infrequently reach a considerable size before they give rise to suggestive symptoms, and they are not sufficiently well defined to enable one to recognize their limitations. Furthermore the brain tissue surrounding the tumor is edematous, making it difficult to distinguish between the infiltrated and edematous brain tissue. I should judge from the table that in all the 23 malignant cases an attempt was made to remove the tumor, as it is noted that there were recurrences in 20 cases within two years. Presumably, however, a radical cure was obtained in the 3 remaining cases. I have always questioned the propriety of attempting to remove these highly malignant infiltrating growths unless they are of very small dimensions, as in one of Horsley's cases in which the patient was still in perfect health nearly four years after the operation.

Horsley's experience with the effect of directly exposing but not removing gliomas is extraordinary and quite inexplicable. In one instance he exposed a tumor on the cortex, but did not remove it; two and a half years later the patient died of erysipelas and at the autopsy it was found that the tumor had disappeared, leaving a cicatricial and degeneration cyst. Since then he has operated upon 10 cases of a similar nature, having all the classical symptoms of tumor, but not always being able to define the tumor itself.

We are indebted to Knapp² for a collection at various times of some 828 instances of operation for cerebral tumor. Up to 1899 he had collected 561 cases, but since that time he has added 267 cases, making the total 828. So many factors must be taken into consideration in drawing conclusions based upon statistical reports that we must accept these conclusions with certain reservations. They must of necessity be more or less misleading. Thus, there is a tendency not to report cases

¹ Loc. cit.

² Boston Medical and Surgical Journal, February 1, 1906.

where the tumor was not found or could not be removed, and this tendency Knapp believes is greater than it was. Again, too often surgeons or neurologists are too apt to report cases as recovered when they have only recovered from the immediate effects of the operation and may not have been relieved of their symptoms longer, or till a recurrence proves fatal. The conclusions are given, however, for what they may be worth. There has been a diminished mortality and greater number of cases benefited. This is attributed to improved technique. There is a relatively greater increase in operations upon tumors not in the central convolutions and in these the operation seems more fatal. The failures in diagnosis are still great and there is but a slight diminution in figures for last six years. This may be due to failure to report unsuccessful cases, rather than to any advance in the accuracy of diagnosis. The cases of actual recovery are excessively few. The optimistic views as to the benefits to be derived from operation are hardly justifiable. According to Knapp, in but half the cases does the palliative operation relieve headache, or arrest the progress of a choked disk. If the toxic theory as to the etiology of optic neuritis is true we would not expect any benefits to be derived from the operation. I am disposed to believe from my own experience that a very much larger percentage will be relieved of headache by a decompressive operation, and if the neuritis is of not too long duration a larger percentage of cases will be favorably influenced. From a study of 104 autopsies (and this, by the way, is never a fair test as to the operability of tumors, since the conditions are not examined until the lesion has been present sufficiently long as to cause death, and nothing is known of the conditions in the early or favorable stage for operation), but 4 seemed to Knapp to be anatomically accessible and presented enough clinical symptoms to come under the heading of definitely operable tumors.

Huisman's¹ contribution includes a review of the histories of 12 cases of brain tumor, chiefly with reference to the diagnosis. Inasmuch as 6 of the 12 cases were operated upon, we may include the results in this discussion of brain tumors. The most brilliant result was obtained in a case of serous meningitis with chronic hydrocephalus. A tumor was suspected, but not found; a decompressive operation was performed, the symptoms entirely disappeared, and four years later the patient continued entirely free from recurrence. This is a type of case which we occasionally meet with when the symptoms point very clearly to the existence of a tumor. An operation is performed, the tumor is not found, and the symptoms disappear. It is difficult to explain these so-called cases of pseudo-tumor; one can readily understand how as a result of decompression the relief may be afforded for a considerable period, but if a tumor was present the symptoms are bound to recur.

¹ Med. Klinik, 1906, Nos. 13 to 15.

I have under observation several cases of this nature, in 2 of which the operation was performed in search of a tumor of the cerebellum, and in 1 for the relief of headache and optic neuritis attributed to a tumor of the cerebrum. In 1 of the 6 cases of Huisman's series following the removal of a glioma the subjective disturbances were considerably improved; headache has not returned and the eyesight is better. 2 other cases really belonged to the inoperable class, because the lesion in 1 was so extensive and in the other too deeply seated. Both of these cases died of meningitis. The remaining 2 cases were operated upon solely with the expectation of relieving the subjective disturbances. I am quite surprised to note his skeptical views with reference to the effect of palliative operations upon choked disk. In only 1 of his series was there any substantial improvement in vision. He agrees with Uhthoff, who is quoted as saying that only in exceptional cases is the choked disk affected by trephining. This surely is not in accord with the views of many other observers of considerable experience. One of the most urgent indications for the so-called palliative operation is the presence of an optic neuritis, providing it has not led already to optic atrophy, and the results which have been obtained over and over again justify this operation, as one by which the patient's vision may be restored. The fatal issue following lumbar puncture in 1 of his cases illustrates the danger attending this procedure in cases of brain tumor. As compared with the decompressive operation, lumbar puncture is so much more dangerous in these cases that its practice should be prohibited. On the whole Huisman looks with disfavor upon the surgical treatment and concludes his article with sympathetic quotations from v. Bergmann and Billroth. It is to be hoped that the influence of v. Bergmann will not in the future, as it has in the past, discourage surgeons in their efforts to alleviate the sufferings of the brain-tumor subject, even though the disease has such fatal tendencies.

Brush has contributed a study of 70 cases of brain tumor. In this series, operation was undertaken in 19, and the tumor found to be accurately localized in 18. In this single exception Brush¹ regarded the case as one of a lesion in the lateral lobes of the cerebellum, but the autopsy found the growth in the frontal lobe. This, however, is not an uncommon mistake. There are two noteworthy facts in this series, a summary of which is given below, one that the tumor was accurately localized in every instance but one, and in but two was found to be irremovable either because of its size, indefinite outline, or malignant nature. Unfortunately the data given in the summary do not include any reference to the length of time the patient survived the operation; presumably all of them recovered, at least from the immediate effects of the operation. It may be noted, however, that the convulsions

¹ Medical Record, August 11, 1906.

were cured in 5, the general symptoms cured in 6 and improved in 6, the vision improved in 5 and unimproved in 4, the paralysis improved in 6, unimproved in 4, and aggravated in 1.

Case I. Subcortical sarcoma of the temporal region. Eighteen months' duration. General symptoms cured. Vision improved. Hemiplegia unimproved.

Case II. Subcortical cerebellar glioma. Two years' duration. General symptoms much improved. Optic neuritis and loss of vision improved. Ataxia unimproved.

Case III. Cortical tuberculous tumor of the Rolandic region. One year's duration. Localized convulsive seizures cured, but the operation was followed by paralysis of the arm, which remained permanent in the extensors of the hand.

Case IV. Cortical sarcoma of the parietal lobe. Three years' duration. General symptoms, optic neuritis, and loss of vision improved. Jacksonian epilepsy cured; the hemiplegia was at first much increased, but afterward improved.

Case V. Meningeal fibrosarcoma of the Rolandic region. Six years' duration. Tremor of the arm with loss of power, cured.

Case VI. Subcortical syphiloma of the occipital lobe. Two years' duration. General symptoms much improved, but the loss of vision and ataxia remained unchanged.

Case VII. Meningeal sarcoma of the Rolandic region. Two years' duration. General symptoms and local convulsive seizures cured, but the hemiplegia only slightly improved.

Case VIII. Meningeal tumor of unknown nature of the Rolandic region. Two years' duration. Tumor not removed, but all its vessels ligated. Jacksonian epilepsy cured. The hemiplegia was at first increased, but subsequently improved.

Case IX. Meningeal tumor of unknown nature of the Rolandic region. Three years' duration. Tumor not removed, but all its vessels ligated. Jacksonian epilepsy of the arm cured; the loss of power in that arm was for a time much increased, but finally recovered.

Case X. Meningeal tuberculous tumor of the Rolandic region. One year's duration. General symptoms and local spasms cured, but the hemiplegia was permanently increased.

Case XI. Subcortical glioma of the parietal lobe. Two years' duration. General symptoms improved, but the loss of vision and hemiplegia remained unchanged.

Case XII. Subcortical sarcoma of the occipital lobe. Two years' duration. General symptoms improved, but the optic neuritis and loss of vision remained unchanged.

Case XIII. Meningeal psammoma of the Rolandic region. Six years' duration. Local convulsive seizures of the arm cured, but permanent paralysis of the extensors of the forearm occurred.

Case XIV. Subcortical sarcoma of the occipital lobe. One year's duration. General symptoms improved, but the loss of vision permanently increased.

Case XV. Sarcoma of the parietal region. One year's duration. General symptoms cured. Loss of vision, hemiplegia, and ataxia improved.

Case XVI. Subcortical sarcoma of the parietal region. One year's duration. General symptoms except mental condition cured. Mental apathy improved. Loss of vision permanent.

ISOLATED CASES OF BRAIN TUMOR. In the case reported by Hugh Smith,¹ the tumor was accurately localized, easily found and removed. The tumor was well encapsulated, situated in the cortex in the *mid-frontal and superior convolutions*, and proved to be a spindle-celled sarcoma. Three months after the operation the patient was practically well and there is a strong probability that there will be no recurrence. With the addition to another successful case there is added justification for prompt surgical intervention in cases of suspected brain tumor. The prospect of a cure, at least up to the arbitrary three-year limit, is as great in this case as after the radical operation for malignant disease of the mammary gland.

In Macewen's² case the patient presented the symptoms pointing to a tumor of the *left motor region*. The operation was performed under chloroform, and lasted three hours. Upon reflecting the flap it was noted that the dura did not pulsate and was adherent in many places to the skull; after a crucial incision the brain immediately bulged, and the rate of the pulse changed rapidly from 50 to 144.

The most interesting feature of this case is the fact that the tumor was found and removed, although it was situated one inch below the cortex. The operator recognized its presence by the increased resistance and its removal was unattended with any difficulty; it proved to be one of the *granulomas*, probably syphilitic in origin. Although the patient was almost comatose before the operation was performed, he began to show restoration of consciousness and return of motion within a few hours, and at the end of the seventh week he was bright and intelligent, although he had some little difficulty in expressing himself. There was still some deficient power in the right arm and leg, but the convulsions had not recurred.

I was especially interested in Barling's³ report of a case of cerebral tumor—an endothelioma—invading the overlying cranial bones, as I have recently seen, in consultation with Dr. Spiller, a very similar case. Before the patient came under Barling's observation he had previously been operated upon by another surgeon, who had removed a button of bone from over the upper end of the left ascending frontal convolution.

¹ Lancet, June 16, 1906.

² Ibid., October 13, 1906.

³ Ibid., August 4, 1906.

There was so much bleeding that the operation was abandoned, and the bone was found to be the seat of a spindle-celled sarcoma. Four or five months later the patient was so much worse that Barling operated and removed a section of bone from over the motor area. The bone was quite porous, almost as vascular as a nevus, and adherent to the dura. Upon reflection of the dura there was exposed a maroon-colored tumor two or three inches in dimensions. Because of the excessive hemorrhage the operation was divided into two stages, and the tumor was not removed until eleven days later. It was about the size of a small orange, seemed to be well defined, and was easily removed with a finger and brain knife. At the last report, two months after the operation, it was noted that the optic neuritis had subsided, there was no headache, convulsions had ceased, and the patient was gaining power in his limbs. The interesting feature of this case, as in the one which came under my observation, but has not as yet been reported, was the question of the bone involvement. In Barling's case it was suggested that the tumor had extended from the brain to the bone, through the dura along the sheaths of the bloodvessels, which had formed in the inflammatory lesions between these structures. As soon as the tumor reached the bone, it spread out in all directions, following the vascular channels of the diploë. It was, of course, important in this case to remove the affected bone, otherwise there would have been prompt recurrence. Cerebral sarcomas of this type are very feebly malignant, so that their extirpation offers much hope of the patient's recovery.

Oppenheim's¹ case is referred to because it belongs to the operable class; a tumor as large as a hen's egg was accurately localized and found in the cortex about the middle of the *postcentral convolution*. It was quite easily enucleated with the fingers. At the time of the report the patient's convalescence was uninterrupted.

Cerebral Abscess. The surgeon has few opportunities as compared with the otologists of dealing with abscess of the brain. In so many cases the infection is secondary to an otitis media that the case falls primarily into the otologist's hands and there it remains. Starr² in a paper upon the intracranial lesions secondary to a chronic purulent otitis media, speaks somewhat at length upon the surgical aspects of the disease. It is imperative to open the skull as soon as the diagnosis is made, but inasmuch as they are operations requiring special skill, a surgeon skilled in cerebral surgery should perform the operation. "Just as the general practitioner or the consultant in internal diseases is able to make a diagnosis of appendicitis, but is careful to call in a surgeon to operate, so I believe that both the neurologist and the otologist, while capable of making a diagnosis of brain abscess, should call in a general surgeon,

¹ Berliner klin. Woch., Band lxxiii, Heft 30.

² Medical Record, March 10, 1906.

or, if possible, a surgeon skilled in cerebral surgery, to operate. We admit the skill of some men in abdominal surgery, or in gynecological surgery, and many a competent and able practitioner, whether general or special, has no hesitation in referring his cases to them. Brain surgery is a department in which special skill and wide experience are essential to success, and this fact should be recognized and admitted, perhaps, more fully than it has been. It may seem a small difference to go on from the mastoid operation to cerebral surgery. It is, in fact, a very difficult matter. It requires different methods. It involves the use of different tools, and it puts one face to face with many complications often not appreciated until they arise, and which are sometimes impossible, with the knowledge and experience lacking, to meet. Men working along one line are often ignorant of what is being done along other lines. It is my fortune to be familiar with many methods of surgical treatment of brain disease, as a spectator at many operations."

From the many opportunities which Starr has had to witness brain operations he has formulated his ideas as to how the operation should be conducted. After thorough disinfection of the entire scalp, a large opening four by three inches in size should be made for adequate exposure. The dura should be opened carefully, and if the abscess be found drainage will be more effectual if the patient is turned over so as to make use of gravitation. If not in sight the presence of an abscess may be indicated by the great venous congestion at one point in the pia. If not it is justifiable to make a long incision always along the summit of a convolution. The two incised surfaces should be separated by a spatula; the finger should not be used for exploration. After evacuation, decalcined bone or rubber tissue, rather than gauze, may be introduced for drainage. If a diffuse encephalitis is found the affected area may be cut out and the subsequent drainage controlled by the tampon. He indorses Horsley's recommendation to use continuous hot irrigation over the exposed surface during the operation. The drainage material is brought out at one angle of the opening and the wound closed. The drain should never be removed by force, but allowed to be pushed out, as the cavity closes around it. Especial stress is laid upon the technique of drainage, as some cases are lost because the abscess drains into the meninges and not externally. As showing the results of operation he quotes a number of individual series; as that of Kocher with 92 abscesses and 51 recoveries; of Oppenheim with 196 cases and 96 recoveries; of Röpke with 148 cases and 59 recoveries. From 1900 to 1906 he was able to collect 81 abscesses secondary to otitis in which operation was performed; 42 recovered, 39 died after an operation, in 6 the abscess was found at autopsy. Of 25 cerebellar cases in the series 16 died. Commenting upon the surgical management of these cases he thinks that in almost every instance operation was unduly postponed, usually to the fifth or seventh day after an abscess,

was suspected. Secondly, as was evident in the majority of cases, the operation was badly done; incisions were too small and drainage imperfect. Sepsis was the most common cause of death, and this might have been avoided had more attention been paid to disinfection, free exposure, and drainage. Thirdly, in cerebellar disease but few characteristic cerebellar symptoms were present; a symptom of importance in the differential diagnosis is the "cerebellar seizure" of Dana; it consists in sudden attacks of extreme vertigo, roaring in the head, relaxations of the limbs, and falling to the ground in a semi-unconscious state. Sometimes temporary blindness and tonic spasm may be seen. These clinical pictures are characteristic of lesions in the cerebello-pontile angle, a common site for abscess as well as tumors. Those who are interested in the diagnosis of abscess of the brain will find a very instructive paper by Spiller in the *University of Pennsylvania Medical Bulletin*, October, 1906.

C. A. Ballance¹ describes the pathogenesis and pathological anatomy of brain abscess. He lays especial stress upon the mushroom shape of abscess cavities and its significance as to the method of evacuation.

In most cases of slowly spreading infection from chronic disease adhesions occur at the site of infection from chronic disease, binding together dura, arachnoid, pia, and cortex. The lymphatic sheaths of the numerous small bloodvessels which traverse the cortex at right angles to its surface are in direct communication with the subarachnoid space and through these, as through a number of capillary tubes, infective matter easily traverses the cortex and reaches the white substance within. The cortex is very vascular, and its connective-tissue element, reinforced by numerous prolongations from the pia mater, is abundantly supplied with connective-tissue corpuscles. Hence, it is able to offer a strenuous resistance to the bacterial attack, and does not ordinarily undergo any extensive destruction. Where it is traversed by the infective material a barrier of fibrous tissue is thrown out, limiting the destructive process to the formation of a narrow track. The white substance is much less resistant and it would seem that the greater the distance from the cortex the more easily does bacterial action cause dissolution of brain substance. Thus the abscess comes to assume a mushroom-like shape, with the narrow portion or stalk attached to the dura at the original site of infection from the bone. Preysing's figures admirably illustrate this important fact, and his paper gives us an example of valuable suggestions for treatment obtained by carefully conducted anatomical dissection, for the stalk is the track through which the infection entered. Its lumen presents a ready-made channel with fibrous walls through which drainage can be effected and the infective material made to leave the brain. This natural tube is not

¹ Trans. Amer. Surg. Assoc., 1906.

liable to be obstructed by the flowing together of the liquid substance of the brain by which the efficiency of all forms of artificial drainage tube is so much impaired. If then the abscess can be tapped through the stalk itself without passing the knife through healthy cortex and meninges, there would be efficient drainage without risk of suppurative meningitis or of hernia cerebri. I have found this plan of drainage through the stalk the most successful.

Operations upon the Hypophysis or Pituitary Body. The hypophysis or pituitary body is so situated as to make it most difficult of access. Situated in the median line and hemmed in by such important structures as the cavernous sinus, the optic tracts and chiasm, the internal carotid artery, the obstacles attending its exposure are manifest. Despite these discouraging facts a number of surgeons have devoted much time and thought, principally on the cadaver, to elaborating a technique which would make it possible to expose and if necessary remove the pituitary gland, and Horsley himself has already operated ten times for its removal. Apart from the technical difficulties the limited knowledge of the function of the gland and of the effect upon the human organism of its removal has no doubt retarded the development and growth of surgical therapy.

The function of the gland has been the subject of many investigations, but it has not yet been determined positively whether in animals the hypophysis is necessary to the prolongation of life. Friedmann and Maass' animals lived for nine months after the operation and when killed they were perfectly healthy. Horsley's animals showed no symptoms, except that after the removal of the gland experimental irritation of the motor part of the brain caused severe tetanic convulsions. With half-grown animals the removal of the gland is followed by an arrest of growth. Clinical observations have taught us that lesions of the pituitary gland, as tumors, are responsible for acromegaly and abnormal development of adipose tissue. The conflicting evidence regarding the effect of the removal of the hypophysis from animals makes it difficult to draw any conclusions regarding the possible effect of a similar operation upon man. The effect of removing a diseased hypophysis from man might be quite different from that of removing a healthy gland from an animal. Schloffer¹ has written a very carefully prepared paper upon the hypophysis in which he has collaborated the views of many observers regarding the physiology and surgical possibilities.

The principal indication for operation on the hypophysis is for the removal of tumors, and fortunately many of the tumors are of a benign nature. Whether or not partial excision of the gland might not be preferable to complete excision is a question he thinks worthy

¹ Bruns' Beiträge zur klin. Chir., 1906, Band I.

of consideration. If acromegaly is due to hypersecretion of this gland, partial excision might be sufficient to arrest the process and at the same time relieve the symptoms due to pressure upon the chiasm and brain. The same principle applies to the treatment of hyperthyroidism by a partial thyroidectomy.

The anatomical changes in the neighborhood of an enlarged hypophysis are such as to render operation more feasible. With the radiograph one can derive valuable information as to the position and extent of the tumor. According to the avenue of approach, operation for removal of the hypophysis may be classed as intra- and extracranial. With the latter there is a greater danger of postoperative meningitis because of the direct communication between the brain and the upper air passages. The extracranial operations are, however, to be preferred because they are attended with fewer technical difficulties. On the cadaver an adequate exposure of the gland may be obtained by a temporary resection of the nose and removal of the median wall of the orbit. In the living subject it is a better plan to resect the nose temporarily and a portion of the upper jaw. The intracranial operations approach the gland through the anterior fossa after the reflection of a large osteoplastic flap; according to Krause's technique this may be executed without opening the dura and the exposure will be facilitated by clearing out the orbit. While therefore it is possible by one or the other methods to expose the hypophysis the operation is of necessity a grave one and should only be undertaken in the more desperate cases.

The Cerebellum. A year ago the subject of cerebellar surgery was reviewed somewhat at length. Meanwhile a number of articles have appeared, showing the continued interest in this subject, both by neurologists and surgeons. The subject of cerebellar apoplexy or cerebellar hemorrhage is reviewed in two communications, one by M. Allen Starr and one by Hamilton A. Ballance. Horsley's¹ contribution, which has already been reviewed, contained some interesting observations, especially with reference to possible disturbance of the function of the cerebellum which may result from removal of a portion of one hemisphere. I have already noted my experience in one case operated upon three years ago in which one third of the hemisphere was removed without any demonstrable functional disturbance, and in one of the cases which will be alluded to the operator reports a similar experience. Mr. Hamilton A. Ballance draws attention to the bulging of the occipital fossa in cerebellar tumors in childhood. In 2 of 4 cases cited by him, bulging of the occipital fossa was quite marked and in 1 was the main localizing sign.

Putnam and Waterman² record the results of a number of operations done for the relief of cerebellar symptoms. Speaking of the surgical

¹ *Ibid.* cit.

² *Journal of Nervous and Mental Disease*, May, 1906.

aspect of these tumors the writers urge that operation may be justifiable and indicated even in cases in which a satisfactory localization is impossible. Though offering no promise of cure, such operations will often relieve intense headache and rapidly developing blindness. Great amelioration or disappearance of headaches follow relief from pressure, as a rule; the chance of saving or improving the sight is illustrated by Paton's investigation in a series of 47 cases which showed optic neuritis. Of the 30 surviving the operation, 22 retained useful vision, although some of them had become nearly blind before surgical aid was employed. As to the frequency with which the tumor is found and removed, the writers point out that results are unquestionably better today than they were ten years ago.

Following is a brief summary of the operative cases included in their report. The first operation was performed in two stages by Mixer, who removed a large piece of bone from the occipital and parietal regions. Upon opening the dura an apparently circumscribed tumor was found in the left cerebellar lobe. The tumor, about the size of a pigeon's egg, was shelled out with ease and found to be a round-celled sarcoma. The patient survived the operation and nineteen months later it was found that she was still improving. In the second case the entire occipital portion of the skull was removed and the dura was freely opened on both sides. No tumor was found. The respirations were entirely arrested, but the patient was kept alive by artificial respiration until automatic breathing returned. A large hernia developed at the site of the operation; when the patient was heard from ten months later his condition was most satisfactory. The respiratory failure observed in this case is one of the most common and at the same time most serious complications attending operations upon the cerebellum. It cannot be attributed to any fault in the operative technique, as it has often been noted even when no operation has been performed, or, as in a case which I referred to in a previous report, when the patient had fully convalesced from the effects of the operation.

The third patient was operated upon by Dr. M. H. Richardson. This operation, as the two preceding, was also performed in two stages. The operator failed to find the tumor, and the patient died five weeks later as a result of purulent meningitis. At the autopsy a large tumor was found under the tentorium, along the inner aspect of the petrous bone. In this case there was a hemiplegia on the same side as an involvement of the sixth and eighth nerves. Localization was therefore difficult. This rather confusing group of symptoms was attributed to the fact that the tumor had forced the pyramidal tracts downward and laterally against the bone on the side opposite the tumor. In the fourth case there was some doubt as to whether the tumor was situated in the right parietal region or in the cerebellum. Two attacks of temporary paresthesia and weakness of the left arm, however, seemed to be the most

definite localizing signs; consequently the skull was opened in the left Rolandic region, and although the dura bulged abnormally the tumor was not found in that region. Two months later the headaches and vomiting returned and a second operation was performed, exposing both hemispheres of the cerebellum, again without finding the tumor. The patient obtained relief from his headaches, but failed slowly and died eight months later. The autopsy revealed a glioma in the right cerebellopontile region. It was evident from the examination that the complete removal of the tumor could not have been effected. The symptoms in the fifth case pointed to a tumor in the left cerebellar fossa. Again the operation was performed in two stages, and upon opening the dura the cerebellar hemisphere thrust itself forward as though under great pressure. A large quantity of serous fluid gushed out, the greater part of it coming from the space between the cerebellum and the tentorium, having presumably made its way through this opening from the ventricles within. The tumor was not found. Seven months after the operation the patient was still free from headaches and vomiting, had gained fifteen pounds, and was bright and well. A hernia about the size of an egg had formed in the left occipital region and at times considerable oozing has occurred through the line of suture. The optic neuritis has subsided.

In the sixth case symptoms were evidently those of cerebellar growth, but the patient died after the first stage of the operation, which had consisted in making a large opening in the skull over each cerebellar hemisphere. At the autopsy the convolutions of the brain were found to be much flattened and the pons and the cerebellum indented with the bony outlines of the base of the skull, the third ventricle was so distended that its inferior wall was pushed sharply out behind the chiasm, suggesting the presence of a large cyst. The lateral and fourth ventricles were similarly distended. The cause of this condition was found to be the pressure of a sarcoma springing from the floor of the fourth ventricle, enclosing the aqueduct of Sylvius. In a final case of the series a considerable portion of the left lobe of the cerebellum was removed to facilitate exploration. The tumor, an encapsulated mass about the size of a walnut, was found on the ventral surface of the pons. The patient reacted well from the operation, but died suddenly four days afterward apparently as a result of the removal of the tampon. This is another example of the impunity with which the lateral lobes of the cerebellum may be attacked, since in spite of the amount removed there was no additional impairment, certainly no considerable impairment of the strength or coördination of the arms.

In one of the cases reported by Moran and Kerr¹ there were no distinct localizing symptoms (very common in cerebellar lesions) and, although at an exploratory operation half of the lobe was removed, there

¹ Virginia Medical Semi-monthly, July 24, 1906.

was decided improvement both in locomotion and coördination. Between the first and second operations a large cyst had formed, probably due to the injury inflicted to the cerebellar tissue at the first operation or to degeneration of the tumor. The patient died about two years after the onset of symptoms and three weeks after the second operation. The tumor, which had not been discovered beforehand, was found to be a fibrosarcoma situated at the floor of the cyst very close to the medulla. One of the peculiar features of the case was the persistent absence of choked disk.

In summarizing the results of these 7 operations, which were performed by four surgeons, I find that there were 3 operative deaths: 1 from the shock of the preliminary craniectomy, that is, after the first stage (they are almost all two-stage operations); 1 from meningitis in the fifth week, and 1 upon the removal of a tampon on the third day. The latter was a most unfortunate accident, since it was the only case of the series which offered hopes of a permanent recovery, the tumor being a fibroma and having been successfully removed from the cerebellopontile angle. In but 2 instances was the tumor found, although a more thorough exploration might have discovered the tumor in 2 others; 1 was situated in the hemisphere, 1 in the fourth ventricle, 2 in the cerebellopontile angle, and 1 just beneath the tentorium; the situation in 2 others is not known because the tumor was not found at the operation, and the patients were living at the time of the report. Of the 4 surviving the effects of the operation, 3 were very decidedly improved and were alive, nineteen, ten, and seven months, respectively; 2 of these were decompressive, 1 a radical operation; the fourth case, also a decompressive operation, was the only one which did not improve except for a short time. It is difficult to comment upon the technique of the operation, as this is not given in detail. In a number of instances the bone was removed from one side to the other, and in 1 of them the patient died soon after this procedure. I do not believe it is either necessary or safe to remove so much bone; there is very much more hemorrhage and the danger of the pons and medulla being affected by so sudden and extensive removal of bone, particularly the bridge of bone in the medulla, is not imaginary. Without wishing to criticize in any way the skill or technique of the various operators, one cannot but wonder what the results would have been in the hands of one who, as Horsley, has made this field one of special study. There is no field of surgery in which specialism may be said to be more called for than in the management of these cases. The opportunities for the average surgeon to operate upon cerebellar tumors are very infrequent, and in the course of a decade he is not apt to have a sufficiently large number of cases to enable him to thoroughly familiarize himself with the many intricate problems that are constantly arising.

TRAUMATIC HEMORRHAGE OF THE LEFT LATERAL CEREBELLAR LOBE.

The attention of Mr. Hamilton Ballance¹ was attracted to this subject by a case in which the diagnosis was subsequently confirmed at an operation. A young boy had fallen upon his head and after a latent period of six weeks the following symptoms appeared: headache, vomiting, dizziness, homolateral paresis of the arm and leg, weakness of the conjugate movements of the eyes, lateral nystagmus to the same side, choked disk, a tendency to fall backward and to the right, and incoördination of the left arm. When giddiness was present the objects in the room appeared to move across him from left to right (that is, away from the affected side) and he himself seemed to be going in the same direction. This phenomenon, according to Stewart and Holmes, is significant of intracerebellar lesions in contrast to extracerebellar lesions, when the sense of personal movement is in the opposite direction to that of the external objects. A suboccipital craniectomy was performed and at a depth of one and a quarter inches from the surface a clot one and one-quarter inches in diameter was found and removed from the cerebellar hemisphere. The patient's recovery was complete. In looking over the literature of the subject Ballance found only one other case of primary intracerebellar traumatic hemorrhage and no instance of such a case being submitted to operation. Almost all recorded cases of cerebellar hemorrhage are due to disease. In most cases the extravasation is extensive and it would appear that the superior cerebellar artery is the vessel most liable to rupture. The pressure of the blood on the pons on the same side is so great that paralysis on the opposite side of the body results. The case above reported is of interest because it illustrates how a hemorrhage in this region may simulate a growth and suggests the importance of paresis of the homolateral limbs, weakness of the conjugate movements of the eyes, and lateral nystagmus as localizing signs of cerebellar disease. Those who are interested in this subject of cerebellar apoplexy will find a brief but interesting paper on the subject by M. Allen Starr.² The history of 5 cases is presented and the symptoms as they bear upon the function of the cerebellum discussed. In 187 consecutive cases of apoplexy examined postmortem at the Presbyterian Hospital, New York, hemorrhage in or softening of the cerebellum was found in 4 cases only. In the records of a large London Hospital, Ballance found only 1 case in 96 consecutive cases of apoplexy.

Epilepsy. One of the most baffling of lesions of the central nervous system is epilepsy, perplexing both to the neurologist and to the surgeon. There are no sharp and well-defined lines dividing the operable from the inoperable cases, and no irrefutable arguments, founded on a scientific

¹ Trans. Amer. Surg. Assoc., 1906, vol. xxiv.

² Medical Record, May 12, 1906.

basis in favor of one as against another method of surgical relief. Order has not been by any means restored out of chaos. There is a link in the chain of evidence missing, namely, a more precise knowledge of the etiology of epilepsy. Trauma may be responsible for epileptic seizures, but the removal of the traumatic lesions will not relieve them. One operation which leaves an opening in the skull will cure some and one which seals the skull securely will cure others; some cases will be uninfluenced by any procedure. There has not been a steady advance following out a definite line of thought, by any considerable group of influential men; there is no concerted effort upon the part of surgeons at least to solve the many difficult problems. There are great opportunities for original investigation in this field.

The discussion of the surgical treatment of epilepsy has resolved itself recently into a controversy between those who are in favor and those who oppose Kocher's theory. For a number of years it was believed that adhesions, cicatrices in the cortex, and a general disposition toward epileptiform seizures were responsible for most of the cases of traumatic epilepsy. In 1889 Kocher, however, advanced this theory upon the etiology, which differed radically from the hitherto accepted views. The factors which were previously considered of paramount importance he regarded as playing an insignificant role. The most important causative factor in the etiology of epilepsy was, he claimed, an increase in the intracranial pressure. Rational treatment should consist, therefore, in the adoption of means whereby this pressure should be relieved, namely, in the establishing of a permanent opening (*ventilbildung*). Horsley's operation he did not favor because it did not take into consideration the fundamental cause. Fraenkel¹ reviews this question in an interesting article in which he takes issue with Kocher. There is no doubt, he says, that there are a number of cases the results of which would seem to justify the Kocher theory, but experience has taught us that it cannot be applied in a broad, comprehensive way to all cases.

A very serious objection to Kocher's plan of operation is the fact that the patient's peace of mind is more or less constantly disturbed by the presence of this vulnerable spot; furthermore there have been cases reported in which very serious results followed blows on this unprotected area of the brain, cases, in fact, in which fatal epileptic seizures have resulted. One case of this character is described in which at the autopsy there was no evidence at all of excessive intracranial pressure, such as might be caused by internal hydrocephalus; the only demonstrable lesions were adhesions and scars. To be sure Stadelmann has shown that the blood pressure may rise very considerably during an epileptic seizure, as from thirty-five millimeters to five hundred millimeters of water.

¹ Wiener klin. Woch., 1905, Nr. 38.

While this observation shows that the pressure is increased during the seizure, there is no evidence of the fact that the increase in pressure is permanent, and can therefore be regarded as the exciting cause. To further disprove Kocher's theory many cases might be cited in which patients who have sustained serious cranial injuries have remained free from epileptic seizures even after the defect was repaired.

Apropos of this subject on the result of *closure of cranial defects* upon epilepsy, we may refer to the clinical and experimental study of Dudley P. Allen.¹ Allen expresses himself in favor of the closure of defects, both as a prophylactic and curative measure. Without any knowledge of the work of Müller and König, he had elaborated a method of repairing defects which corresponds closely to the so-called Müller-König method. For the benefit of those who may be desirous of repeating this operation this technique is quoted in full:

The scalp is removed from over the defect in the skull and the connective tissue covering the brain is carefully dissected away. Since the scar tissue and dura are often inseparable, the pia mater covering the brain tissue may be thus exposed over the entire area. In certain cases in which the injury to the brain tissue has occurred as the result of traumatism, it may be necessary to trim away a portion of the brain with the scissors, since the connective tissue may be firmly connected with the brain tissue itself. The borders of the opening are carefully examined to see if any portion of the bone projects downward, and if so it is removed by means of rongeur forceps. Any hemorrhage which occurs is carefully stopped, since it is an essential part of the operation that all hemorrhage should be controlled before the bone flap is inserted. When the surface upon which the bone flap is to be implanted has thus been made clear and hemorrhage has been checked, the scalp is removed from an added area of the skull of equal size with the opening. In doing this care is taken that the periosteum covering the skull be left intact. It is also important that the portion of skull laid bare be as thick as possible. Thus, the posterior parietal region is preferable to the temporal region. Upon the area thus laid bare a circular or elliptical incision is made, blocking out a portion of periosteum equalling in form and size the defect which is to be covered. A sharp, narrow chisel is then employed to split from the outer surface of the skull the portion of bone adherent to the overlying periosteum. To separate this bone from the skull the blows of the chisel should be short and quick so that the portion of the bone split away reaches no deeper than the diploë. In the removal of this area of bone with attached periosteum the tendency, of course, is for the bone to be separated into small fragments, and to roll upward and outward. By placing the graft thus obtained between two gauze sponges moistened in warm normal salt solution and laying

¹ Boston Med. and Surg. Jour., April 12, 1906.

it upon the table, it may be flattened out by a few slight blows of the mallet. The plate of bone thus prepared is laid upon the opening in the skull, the bone being next to the brain. The wound is then closed by drawing over it the scalp and suturing it loosely in place.

seem to demonstrate beyond question the feasibility and efficiency of

The seven cases upon which this method has been practised since 1900 this method. In every case the wound healed by first intention, and the defect has been repaired by what seemed to be bony structure. In one case the patient, who was suffering from psychic disturbances following injury, was relieved for a period of three years, when he committed suicide. Another was reported as free from the headaches, for the relief of which he was operated upon, two years later. A third, suffering from epilepsy, had had but two attacks in three years. Since the operation a fourth, also a subject of traumatic epilepsy, had had no seizures for three years; a fifth, but one seizure in the year following the operation; a sixth, one year after the operation, had had no recurrence, and his mental condition was much improved; before operation he was dull and unable to study. He is now reported as bright in his studies and perfectly well.

To study more fully the process of repair after this operation, a series of operations were undertaken upon dogs. The tissues at the seat of operation were examined histologically at various intervals and as a result of this histological study the following conclusions were drawn: the initial process is the filling of the gap between the graft and the peripheral bone with connective tissue, which arises principally in the periosteum of each, and which at two weeks had already undergone considerable calcification. The graft remains viable and intact, and begins to grow both in thickness and at its edges. Growth of the free edge of the peripheral bone is more marked than in the graft. The growth of these gradually replaces the initial calcification, and at five months only a trace of the process remains. The probabilities are that after a longer time there would be a true bony fusion.

Navratil¹ includes, in the contra-indications for operations upon cases of *Jacksonian epilepsy*, those of long standing, when the habit is well established, alcoholism, constitutional disturbances, and neurasthenia. The exact diagnosis between genuine and traumatic epilepsy is sometimes very difficult, as one may have a genuine epilepsy with associated trauma. In such a case as this also the operation is contra-indicated. He approves of the osteoplastic operation so that the defect in the bone may always be repaired. In every case it is necessary that the patient should be restrained for some time, so that the nervous system is taxed in no way until its tone has been fully restored.

Rinne² reports some observations which were made to determine the

¹ Beilage zu Budapesti Orvosi Ujság, 1906, 11.

² Deut. med. Woch., 1906, Nr. 36.

centre for the right arm, in which the seizures always began. With a bipolar electrode he explored the motor area to determine the situation of this centre. Application to the upper portion of the precentral convolution caused bending of the forefinger, flexion and adduction of the thumb in the right hand. When the strength of the current was increased, there were movements at the wrist and elbow joints. These responses were obtained, however, only when the electrode was applied at a fixed point. In fact the results of the faradization of any other portion of that convolution were entirely negative. The region of the cortex corresponding to the centre for the forefinger and thumb of the right hand was excised, the tissue removed measuring 3 to 4 mm. in thickness, 1.5 cm. in length, and 1 cm. in width. The results of the operation were on the whole satisfactory. The patient's mental condition improved so that he was able to superintend an active business, and twelve years after the operation he continued in good health, although he had occasional attacks. There is still a little weakness in the right arm. Rinné is in favor of this operation in those cases in which no definite lesion can be found. Cortical faradization is the only accurate way by which the centre may be localized. With reference to the technique, it might be said that the unipolar is very much more accurate than the bipolar electrode.

In the following instance the patient had sustained an injury to the head two years previous to operation. Fifteen minutes after the injury there was loss of consciousness and twitching in the right arm. At various intervals since that time he has had one-half dozen or more attacks of the same character. The patient was under the care of Baldwin, and at the operation, which was performed by Mumford,¹ an extensive cyst was found in the motor region. The dura was found quite adherent to the calvarium, and was torn in reflecting the osteoplastic flap. Following the teaching of Kocher, who advocates decompression in the treatment of epilepsy, the bone of the flap was removed. There has been no recurrence of the epileptic seizures in the fifteen weeks that have elapsed since the operation.

PORENCEPHALUS AND EPILEPSY. The advisability of operation after cranial injuries as a prophylactic of subsequent psychic disturbances is none too well appreciated. Many cases of epilepsy might be avoided if a less conservative policy prevailed. The case of Ranzi² is quoted not so much to show the relation of cause and effect between trauma and epilepsy as to describe the peculiar condition found at the operation. The porencephalic cavity, the size of an egg, communicated directly with the posterior horn of the lateral ventricle, so that one could see the choroidal plexus. The cavity was packed with gauze; the patient died on the sixth day, not as the symptoms indicated, from

¹ Boston Med. and Surg. Jour., December 6, 1906.

² Wiener klin. Woch., 1905, Nr. 47.

meningitis. As no evidence of this was found at the autopsy it was thought that death may have been due to the cerebral edema consequent upon increased intracranial tension.

Trifacial Neuralgia. A MODIFICATION OF KRÖNLEIN'S TRIGEMINUS OPERATION. This modification of Krönlein's operation, which is designed to divide the second and third branches at the base of the skull, was suggested by Lexer.¹ He claims the operation is simpler, that it may be done in a short time, except in cases of severe hemorrhage; that injury of the facial nerve, with the exception of unimportant frontal branches, can be avoided with certainty, and that hemorrhage, as a rule, is slight and easily controlled without the necessity of ligation of the temporal or middle meningeal arteries. The operation is not an easy one to perform, however, unless one is thoroughly familiar in the exact anatomical details. In some cases, too, the hemorrhage is quite copious and severe and annoying as operation for the removal of the Gasserian ganglion. One should try particularly to avoid the pterygoid plexus, as this is the most common source of bleeding. The operation is begun with a cutaneous incision which passes along the upper margin of the zygoma, through the skin and temporal fascia. The zygoma is then divided at either end and the flap containing it retracted downward. The temporal muscle is then brought into view, and its posterior margin detached from the bone and forcibly pulled forward. It may be necessary in some cases to nick the margin of the muscle. The periosteum is then divided exactly at the top of the pterygoid ridge, being careful to avoid the insertion of the pterygoid muscles. With a blunt hook introduced into the periosteal wound the periosteum and pterygoid muscles are detached from the bone. This will expose the zygomatic fossa and in its posterior portion the foramen ovale with the third branch. The latter may be pulled forward with a small curved hook and avulsed with forceps. The second branch may be removed if necessary through the same incision. This operation is about as difficult as the intracranial operation, and has no especial advantage. To be sure the cranial cavity is not opened and the remote possibility of infection can be disregarded. However, there is a very limited exposure, the operation must be performed with the greatest precision to avoid hemorrhage, and judging from the illustration it would appear that the upper branches of the facial nerve would be divided. The resulting paralysis would not be so serious after a simple division of the third branch as it would be after removal of the ganglion, when every measure should be adopted to prevent corneal ulceration.

Van Hook² believes that the Lexer operation for removal of the *Gasserian ganglion* deserves greater popularity than it has yet attained. He

¹ Surgery, Gynecology, and Obstetrics, January, 1906.

² Ibid.

records 3 cases in which this operation was practised and the patients recovered. One of the cases was a patient upon whom an operation for removal of the Gasserian ganglion had been undertaken in 1893, but in which a small portion of the ganglion had not been removed. The only relic of the ganglion which could be recognized was a small strand of tissue 1.5 cm. long, 0.5 cm. broad, and a few mm. thick.

Lloyd¹ has excised the Gasserian ganglion in 11 cases without a death. Up to the present time there have been no relapses, the longest interval since operation being six years and eight months. The duration of the attacks ranged from two to twenty years; 3 of the patients were in the forties, 3 in the fifties, and 1 in the seventies. The operation was performed by the Hartley-Krause method. The operator is inclined to agree with those surgeons who believe that the removal of the anterior half or more of the ganglion is followed by a complete disappearance of the symptoms. He usually removed the whole or part of the ganglion by first dividing the superior maxillary division close to the foramen rotundum, next the inferior division, and then, by seizing the lateral branch with long-bladed forceps and pulling it forward and outward, cutting about one-half inch behind, through the tissue which has been lifted off from the petrous bone. Deliberate attempts to isolate the ophthalmic division are likely to lead to wounding of the cavernous sinus. He always succeeds in completing the operation at a single sitting and preserves the bone in the flap. He believes less deformity follows replacement of the bone than when the bone was taken away altogether.

Ricketts² takes a rather pessimistic view of intracranial operations for the relief of trifacial neuralgia. The Hartley-Krause method, he says, has given a mortality of 25 to 30 per cent., which, however, has been reduced to 5 per cent. in the hands of some individual operators, and this he believes should be sufficient cause for its discontinuance. If the intracranial method is to be chosen, he prefers that of Krönlein, because there is less deformity, a lower mortality, less motor paralysis, and less risk of loss of vision. He makes the sweeping statement, however, that all intracranial operations for the removal of the ganglion should be abandoned because of the high mortality, if for no other reason. Preference should be given in the order named to the following operations: (1) avulsion of the distal branches; (2) avulsion, with ligation of common and external carotid arteries; (3) division of the second and third branches by the Lexer method; (4) Lexer's method plus avulsion of the branches; (5) the former plus ligation of the external and common carotid arteries; (6) removal of the ganglion and neurectomy of the distal branches.

¹ Birmingham Med. Rev., January and February, 1906.

² Buffalo Med. Jour., April, 1906.

After reviewing the various theories as to the etiology of trifacial neuralgia Moschowitz¹ concludes that the pathological changes in the ganglion which have been noted in some cases may easily be accounted for as secondary products: such, for example, as rough handling of the nerve or ganglion during its extirpation, incomplete preservation of the ganglion after removal, the age of the patient, and ascending changes in the nerve or ganglions as the result of the peripheral operations. The extirpation of the ganglion is not, he believes, the ideal operation, inasmuch as there have been undoubted recurrences. These recurrences he assumes to have been the result of regeneration of the nerve fibers, and therefore believes the ideal operation to be one in which the nerves are divided, either peripherally or centrally, and some substance introduced to prevent regeneration. In the peripheral operation the foramina may be plugged with gold or silver, and in the central operation celluloid or a gold button introduced between the ganglion and the branches at the point of division (substituting celluloid or gold for the rubber tissue of Abbe's operation).

Poppert² calls attention to the possible danger of the continuous pressure of a retractor during the course of an operation for the removal of the Gasserian ganglion. At least in a case in which he had operated himself he found at the autopsy very decided changes in the brain, which he attributed to the pressure of the retractor. The operation, which was attended with a good deal of bleeding, lasted two hours. Upon recovery from the effects of the anesthetic the patient was found to be hemiplegic and died the following day. The autopsy revealed the cortex on the under surface of the temporal lobe, softened and discolored. Upon frontal section the hemisphere on the affected side seemed to be swollen and softened. In the corpus striatum also there was a small area of softening which was undergoing degenerative changes.

SYMPATHECTOMY FOR THE RELIEF OF TRIFACIAL NEURALGIA. In a recent monograph Louyriac³ reviews Jaboulay's experience with this operation. Jaboulay has resected the superior cervical ganglion ten times, and the operation has been repeated seventeen times by other surgeons. In 26 of the 27 cases the pain disappeared on an average of fifteen days, in some as early as the second day, and in others as late as the sixtieth day. In 4 cases the cure has been permanent, in 4 there has been permanent improvement, and 2 recurrences. These 10 cases were under observation from seventeen months to six years. One of the permanent recoveries was in a case which recurred after the removal of the Gasserian ganglion. Most of the cases were of the major type, having resisted not only the ordinary antineuralgic remedies, but also various peripheral operations. Jaboulay usually begins the treatment by peripheral resection and avulsion of the two branches of the affected

¹ Medical Record, September 29, 1906.

² Deut. med. Woch., 1906, Nr. 22.

³ Thesis, Lyon, 1905.

nerves. He extirpates the inferior dental and intraorbital by the intra-buccal routes. He is opposed to the operation of resection of the Gasserian ganglion; it is neither more effectual nor more permanent in its effect and certainly a much graver operation than sympathectomy. Sympathectomy effects a cure by degeneration of the sympathetic fibers of the trigeminus. The slowness of this degeneration explains the gradual disappearance of the symptoms. This operation is rarely practised in this country. It can claim no advantages, either as regards the immediate or ultimate results, over the intracranial operation upon the ganglion or its branches. It will be noted that in but 4 of the 27 cases has the patient been permanently benefited.

Traumatic Facial Paralysis. The number of traumatic wounds of the facial nerve, according to Jacobsohn¹ seem to have increased enormously. In comparing the statistics of Philip and Hubschmann up to 1894 with the material from his own clinic he saw that, according to the former, among 130 cases of paralysis of the facial nerve 6 to 8 were of traumatic origin (5 to 6 per cent.), whereas in his own clinic the percentage was 14 per cent. This increase seems to be due to surgical interference. All 6 cases were of this nature. The increase of operations on the head and face, particularly radical operations in the neighborhood of the auditory apparatus, is responsible for the frequent wounding or severing of the facial nerve. Sometimes the nerve is intentionally injured, as in cases of malignant tumors of the parotid or retromaxillary region, where the nerve has to be sacrificed for the sake of the patient. Sometimes, as when the nerve takes an abnormal route, it is injured accidentally. Care should be taken in the Hartley-Krause operation to avoid injuring the upper branches of the nerve. This can readily be done if one does not prolong the incision below a line drawn from the tip of the mastoid bone to one-half inch above the supraorbital ridge.

THE FACE.

Congenital Hypertrophy of the Face. Unilateral hypertrophy of the face is a rare affection. Werner² found records of only 9 cases, including his own. It is associated at times with enlargement of the extremities, and may be divided into two classes, according to whether the bone and soft parts are equally involved, or whether the process is limited to the soft parts. Pagenstecher³ relates the history of a woman aged thirty-five, upon whom, at the age of five, an operation had been performed for a deformity caused by an enlargement of the jaw and cheek. The hypertrophic process recurred and continued until there

¹ Deut. med. Woch., July, 1906, Nr. 29.

² PROGRESSIVE MEDICINE, March, 1906, p. 68.

³ Deut. Zeit. f. Chir., May, 1906

was an unsightly deformity of the face and mouth. At the operation the following lesions were noted: hypertrophy of the fatty tissue, enlargement of the salivary glands, thickening of the hypoglossal nerve, degeneration of muscular tissue, thickening of the malar bone and alveolar process of the upper jaw. The malar bone was entirely removed and a wedge-shaped piece excised from the cheek, including the angle of the mouth. The process seemed to advance when the patient attained full stature. Concerning the etiology, there may be in these congenital cases some trophic influence or some change in the nervous system, perhaps irritative in character, which acts as a stimulus and leads to excessive tissue formation or hypertrophy. Ligation of the external carotid artery is entirely without influence in inhibiting the advance of the process.

Congenital Malformations of the Face. A peculiar malformation of the face similar to two previously recorded cases is described by Kirchmayr.¹ The patient was a girl, aged four months. The left half of the upper lip contained a cleft two and two-tenths centimeters wide and extending through the hard and soft palates. There was also a communication between the mouth and nostril which admitted a finger. The outer edge of the intermaxillary bone protruded into the cleft in the lip. The left half of the nose was well formed except at the lower portion corresponding to the position of the lip defect, where the nasal orifice was absent; the left upper eyelid was without eyelashes. Beginning at the roof of the left orbit, at its inner portion, was a trunk-shaped body two and two-tenths centimeters long and covered with skin. This body, having a depression at one end, was elastic, freely movable, and attached to the temporal bone by a partially ossified cartilaginous membrane. This was removed and three weeks later the defect in the lip was closed. There were no congenital lesions in any other part of the body nor in the joints. As to the etiology, the author attributes the defect to a possible injury which occurred in the early weeks of embryonal life.

Paraffin Prosthesis. In the correction of various deformities by this means, different varieties of paraffin have been used. Eckstein² and others prefer the hard paraffin, with a melting point at 50° C. (122° F.). Embolism, an occasional and serious complication,³ has been attributed to the use of soft paraffin, and has never occurred from the use of the hard variety. The latter apparently is never absorbed; in some cases it has been observed *in situ* for at least five years without any appreciable diminution in bulk. The most important advance in technique consists in the implantation of paraffin through an open wound, when injection is not possible, because

¹ Deut. Zeit. f. Chir., January, 1906.

² Zent. f. Chir., 1906, Nr. 28,

³ PROGRESSIVE MEDICINE, March, 1906

of cicatricial contractions or inelasticity of the skin. Frequently two methods, implantation and injection, may be combined to advantage. Eckstein has used paraffin in over two hundred nasal deformities without a single accident and with most encouraging results. The histological study of tissues, injected with paraffin is of considerable interest now that sufficient time has elapsed since the method was introduced to enable one to report upon the ultimate effect upon the tissues. According to Heidingsfeld¹ the paraffin is slowly absorbed and gradually replaced by fibroconnective tissue. Its removal is effected through the agency of the phagocytes; the material acting as a foreign body becomes promptly encapsulated with newly formed fibroconnective tissue. It stimulates the surrounding tissue to proliferation and to adenomatous changes resembling those of early malignancy. The segregation of the encapsulated paraffin in cavities gives the condition an appearance not unlike Swiss cheese.

As a result of the successive degeneration of the invading phagocytes, one sees areas of flattened, non-nucleated cells, giant cells, and fibroconnective tissue. These areas are separated by an areola of fibroconnective tissue, which gives to the whole area an alveolus-like structure. Its analogy to tuberculosis is marked. The paraffin, like the bacilli, acts as a foreign body, incites to a leukocytic invasion, which undergoes degeneration, caseation, and giant-cell formation. The terminal process is a complete fibrosis.

Actinomycosis of the Cheek. The early recognition of actinomycosis is of great practical importance, for in this stage the disease is curable in a comparatively short time. A girl seven and a half years of age, when seen by Knox,² had had an abscess of the cheek about five weeks. The tumor was about the size of a small walnut and irregular in outline; small areas of softening could be detected by bimanual palpation. At these points the cutaneous surface was quite thin and bluish-red in color. The buccal mucous membrane presented several small abrasions, evidently points at which the infection had occurred. On opening the abscesses typical granules were seen in large quantities and the diagnosis confirmed by microscopic examination. The carious teeth were removed, the mouth kept clean, the cheek treated with boric acid fomentations, and forty-five grains of potassium iodide a day given internally. Considerable improvement was noted within a month, and ten months later only a small cicatrix was left to mark the site of the former infection. No improvement was noted until the patient was fully under the effects of the iodide. In order to prevent the infection spreading throughout the gastro-intestinal tract the author suggests the advisability of opening the abscesses externally. In advanced

¹ Journal Cutaneous Diseases, November, 1906.

² Lancet, November 3, 1906.

cases it has been noted that the administration of potassium iodide does not arrest the progress of the disease.

Nevus of the Cheek. Callier¹ reports a case in which soon after birth a dark spot was noticed on the cheek; it increased slowly in size until it extended from the right corner of the mouth backward as far as the right pillar of the fauces, and involved the whole thickness of the cheek. Externally a tumor covered only by thin skin was quite apparent, and in the mucous membrane on the inner aspect of the cheek a dark-blue mass of veins could be seen. In considering the various forms of treatment Callier considered electrolysis out of the question in such a young patient with such an extensive lesion. Excision could not be resorted to because of the extent of the lesion, while to cauterization there was the same objection as to electrolysis. The injection of coagulating liquids was not employed because of the risk of sloughing, thrombosis, and abscess. Accordingly it was decided to attack the nevus by stages, and to combine multiple ligature with one of the other methods enumerated. With the mouth well opened, six ligatures were passed from above downward with curved needles through the inner aspect of the nevus, so as to include not more than half its thickness. Considerable hemorrhage resulted from the first ligature, necessitating ligation of the facial artery. The end result of the operation was exceedingly gratifying; in three weeks the mass had considerably diminished in size, six weeks later cicatrization was complete.

Plastic Operations on the Cheek. Numerous methods have been devised to close the defects following destructive lesions of the cheek. Meissl² in several cases has obtained excellent results with Gersuny's method. In the first case the cicatrix was excised and a flap from the cheek turned in to cover the defect. The cosmetic effect was good and the hair which grew on the inside of the mouth caused but little annoyance. The presence of hair on the inside of the cheek must be regarded as an objection to this method, and to obviate this v. Eiselsberg proposed the following modification: the flap is cut from the cheek beneath the orbit and this defect in turn covered by a flap from the forehead. v. Eiselsberg has utilized the tongue in two cases of malignant disease of the cheek. The tongue was split parallel to the floor of the mouth, as far as the median line, and sutured to the skin of the cheek. The motion of the tongue was not interfered with very much, since the end was free. This method is particularly applicable in cases in which flaps cannot be obtained from the skin, either because of a previously existing disturbance or the presence of cicatricial tissue.

Cancrum Oris. The clinical picture of this disease is well known; recent contributions have been directed toward the study of its etiology

¹ Medical Press, June 27, 1906.

² Arch. f. klin. Chir., Band lxxviii, Heft 4.

and treatment. The disease is apt to occur as a complication particularly of measles and typhus, and when seen in the epidemic form is attributed to a spread of either one of these infections. Inoculations with tissue removed from the affected areas does not produce specific lesions. Bacteriological investigations reveal the usual saprophytic organisms seen in the mouth, and recently Perthes has isolated a streptothrix. Pure cultures of this fungus have not been obtained. Thus far, animal inoculation has given negative results. Telford¹ records a case, interesting because of the mode of treatment and of the recovery of the patient after the disease had made considerable progress. The patient was decidedly septic; the right half of each lip and a portion of the cheek had disappeared. The outer portion of both jaws was destroyed and a deep ulcer presented, the edges of which were irregular and necrotic. The diseased tissue was removed, pure carbolic acid applied locally, and the wound tamponed. Following the operation six thousand units of diphtheria antitoxin were injected and two thousand units every day for the next week. The process was arrested and later the defect repaired by a plastic operation. The author is inclined to accept the modern views as to the etiology of the disease which attribute it to a diphtheritic or a pseudodiphtheritic bacillus.

Micrognathia. Abnormal smallness of the lower jaw may be either congenital or acquired. The former may be associated with severe disturbances in the development of the ear; the latter is the result of a chronic inflammatory process and terminates usually in ankylosis of the temporomaxillary articulation. The facial disfigurement in cases of acquired micrognathia is the source of great annoyance to the patient and often interferes with his advancement in many callings. Many operations have been devised for the relief of this distressing condition. Auffenberg² describes an operation which consists essentially in dividing the bone in such a way that the saw cuts are step-like; by sliding one segment over the other the jaw is elongated. The fragments are retained in position by means of silver wire. In so far as function and cosmetic effect were concerned the results were quite satisfactory. As a matter of fact, however, in many cases attempts to improve the condition fail, and for this reason great stress should be laid upon the prophylactic treatment. Inasmuch as acquired micrognathism is due to the arrested development following ankylosis, the sooner an operation is performed to relieve the ankylosis the better.

Defective Closure of the Jaws. In two cases of this character the disturbance seemed to be due to *arthritis deformans*. In one the lower jaw was so protruded that it could not be brought into apposition with the upper jaw. In the other the bone was displaced to one side as in an untreated dislocation. v. Eiselsberg³ resected the head of the

¹ Medical Chronicle, July, 1906.

² Arch. klin. Chir., Band lxxix, Heft 3.

³ Ibid.

mandible in both cases, and apart from a transitory facial paralysis in one case the results were entirely satisfactory.

Resection of the Upper Jaw. The entrance of food into the unprotected nasal cavities and the disturbance of speech following resection of the upper jaw are two of the unpleasant results of this operation. In some cases this objectionable feature cannot be avoided, since the extent of the lesion necessitates the removal of the floor of the nose, and thus establishes a communication with the mouth. Owing to the extent of the lesion, Israel¹ believes that in those cases in which the malignant disease arises from the alveolar process or the outer wall of the jaw, the mucous membrane of the nose may be preserved. The incision is made, as in König's technique, but before sawing through the nasal and alveolar processes the mucosa and underlying periosteum on the floor and outer wall of the nose are dissected free. Healing was prompt and there was no necrosis of the nasal tissues. Speech was not disturbed and there was no tendency for food to enter the nostril. Two years after the operation the nasal cavity was found somewhat smaller, but still admitted of the entrance of air. Bilateral resection of the jaw is seldom required, but 30 cases have been reported. To obtain the best functional and cosmetic results, one should observe the same precautions, as regards the preservation of the floor of the nose, already alluded to in unilateral resections. Hildebrand² reported his experience in 2 cases in which this modification of the conventional operation was observed. The earlier steps of the operation were carried out with the patient in the sitting posture, but the manipulations upon the bone itself with the Rose posture. He does not resort to preliminary ligation of the carotid or tracheotomy. Immediately after the operation the palate encroaches somewhat upon the cavity of the mouth, but later on it retracts and regains its normal position.

FRACTURE OF THE UPPER JAW. Fracture of the superior maxilla, caused by direct blows over the malar bone, is generally classed as a fracture of the malar bone, involving its body or the zygomatic arch. As shown by Lathrop³ the lines of fracture are chiefly in the superior maxilla. The resulting discomfort is no greater than that caused by a simple contusion, owing to the fact that the fracture is generally impacted. But in due time the swelling subsides, leaving in untreated cases a varying degree of asymmetry. Two methods have been employed to correct the deformity; in one an incision is made directly over the malar bone for the purpose of inserting instruments to elevate the depressed fracture, but this has been objected to because of the scar and the inability to maintain apposition of the fragments. The introduction of blunt instruments by the mouth under the zygomatic arch obviates a facial

¹ Zent. f. Chir., 1906, Nr. 37.

² Berlin. klin. Woch., 1906, Nr. 32.

³ Boston Medical and Surgical Journal, January 4, 1906.

scar, but does not provide for the proper retention of the fragments. Lathrop prefers to approach the fracture and elevate the fragments through the canine fossa. He makes a horizontal incision along the line of junction of the mucous membrane of the cheek and the alveolus. The antrum is opened by the aid of blunt instruments; the depressed fragments are elevated and maintained in position by packing the antrum with gauze. The gauze is removed on the fifth day. Lathrop carried out this method in 9 cases with satisfactory results. The author has operated upon 2 cases of depressed fracture of the superior maxilla, in both of which the manipulations were carried on through a half-inch incision in the cheek, and the resulting scar was scarcely noticeable. There is no question as to the propriety of operation in all cases of fracture where the fragments are depressed, since, if untreated, the resulting deformity is very conspicuous. As to the choice of methods, preference should be given to the antral route, which leaves no visible scar.

Epithelioma Adamantinum. Epithelioma adamantinum, or, as named by some, adamantianoma, is usually situated at the angle of the jaw, and by its presence causes a pressure atrophy so that the bone may become thin as parchment. The growth is comparatively benign in character and does not give rise to metastasis; in many cases, however, the cyst becomes infected, in some following operation, in others through carious teeth. In Steensland's¹ case the tumor had existed for twenty-seven months and extended from the angle of the lower jaw to the median line. It was composed of connective-tissue stroma and alveoli; the latter were lined with epithelial cells and were filled with cells derived from the enamel organ. Ferrero's² case gave the history of a growth of six years' duration, gradually extending into the oral cavity. The original cyst was removed on three occasions, its wall resected, and the cavity curetted. The histological features were similar to the case first described, excepting that in addition he found a number of small epithelial cysts, containing an amorphous substance.

Double Lip. The condition spoken of as double lip is in reality a hypertrophy or enlargement, not of the whole lip, but of the labial glands. The mucosa covers the enlarged glands and the resulting deformity is quite characteristic. The condition appears usually in young males, runs a chronic course, affects the upper lip, is bilateral, the folds usually being separated by the frenum. The etiology is unknown; in 1 case there may have been some relationship between the development of the glandular hypertrophy and preëxisting irritation of the teeth. Edington³ has seen 3 cases, and states that while the condition may not be uncommon, references to it in the literature

¹ Journal Experimental Medicine, 1905, No. 4.

² Riforma Medica, January 6, 1906.

³ Glasgow Medical Journal, February, 1906.

are rare. In the first case there was the history of some dental disorder at an early age which necessitated extraction of several teeth. This was followed by gradually increasing thickening of the lip. The red probium was unaffected, but behind it was a fold of mucous membrane which covered the teeth and which was interrupted in the midline by a frenum. On palpation enlarged mucous glands could be detected. An elliptical incision permitted the glands and redundant tissue to be removed. Microscopically the tissue contained enlarged labial glands embedded in scanty connective tissue. Both cases were followed by an excellent cosmetic result.

Congenital Fistula of the Lower Lip. The common occurrence of congenital malformations of the upper lip stands in striking contrast to its comparative infrequency in the lower. There has been considerable speculation as to the etiology of this condition. It is generally believed that the lesion in the lower as well as in the upper lip is due to an arrest of development. Quite recently Stieda¹ has elaborated a theory as a result of an anatomical study of 18 cases, including 1 under his own observation. He attributes the fistula to an excessive growth and ultimate closure of two congenital furrows; under normal conditions these grooves or furrows disappear, but at times persist and may remain through the life of the individual. In the author's case of an infant eight days old there was, in addition to the fistula in the lower lip, a cleft palate and a harelip. The fistula was located near the median line at the mucocutaneous junction, was about five millimeters in length, presented at its orifice a small, nodular elevation, and ran in a horizontal direction terminating beneath the mucous membrane. The fistulas were closed at successive operations.

Cancer of the Lip. The more one operates for malignant disease the more one is convinced that unless the operation is to be a radical one, including a thorough and painstaking dissection of the lymph-node regions, the operation had better not be performed at all. By a radical operation is implied the entire removal of the primary growth with a wide margin of healthy tissue on all sides, and careful dissection not only of all the palpable lymph nodes, but of all the fatty tissues, leaving nothing behind but bare muscle and the necessary vessels and nerves. Hutchinson² says: "In every case of epithelioma of the lip the submaxillary triangles and the submental space should be cleared of their contents at the time the primary growth is removed." Because it is impossible to determine on which side the glands are involved, or whether or not the submental glands are involved at all, the only safe plan is to clear the space from one angle of the jaw to the other. His incision starts at the angle of the jaw and curves downward toward the hyoid bone, dividing the skin, platysma muscle, and fascia. The facial vessels

¹ Arch. f. klin. Chir., Band lxxix, Heft 2.

² Brit. Med. Jour., May 26, 1906.

are isolated and ligated; the submaxillary gland is lifted up and separated from the upper margin of the lower jaw, and its duct ligated. A second incision is then made parallel with the first, and by reflecting the two skin flaps the whole space between the two anterior bellies of the digastric is exposed down to the hyoid bone. Not until this dissection is complete is the primary growth excised. It is criminal to wait until the glands can be palpated before attempting their removal; neither should the operation be limited to the palpable ones. The operation is not attended with much hemorrhage after the preliminary ligation of the facial vessels.

Drainage should be instituted for several days and the dressings protected with a waterproof covering to prevent infection from the saliva. In 50 per cent. of the cases, when first seen by the surgeon, palpable nodes are present. The x-rays have little or no effect upon the glandular deposits of squamous carcinoma.

Cheattle¹ objects, and very properly, I think, to the wedge-shaped incision which is usually used, and recommends a wide rectangular incision. No doubt many cases of recurrence are due to the verging edges of the customary V-shaped incision encroaching upon the malignant tissue. If the cancer is situated, as it usually is, midway between the angle of the mouth and the middle of the lower lip, two incisions are made, one beginning one-eighth of an inch internal to the angle of the mouth and extending downward and slightly outward through all the structures as far as the lower margin of the inferior maxilla; the other beginning one-eighth inch external to the median line and extending downward and slightly inward through all the structures to the lower margin of the inferior maxilla. The third incision along the margin of the jaw joins the first two. When this section of tissue is removed the resulting deformity is not so great as one would imagine; at all events, the cosmetic effect is of secondary consideration as compared with the necessity of removing the entire cancerous tissue. Seidel lays stress upon the importance of avoiding pressure upon the affected region during the operative manipulations. The possibility of squeezing cancerous cells out into the neighboring structures is not an imaginary one. The ulcerated surface should not be allowed to come in contact with healthy tissue.

THE MOUTH.

Carcinoma of the Mouth. We are indebted to Meller² for a very extensive and comprehensive study of this subject, including the records of 207 cases. He found that men were affected fifteen times as

¹ Practitioner, July, 1906

² Deut. Zeit. f. Chir., September, 1906.

often as women with cancer springing from the mucous membranes of the mouth and pharynx, and that every portion of the mouth can be so affected. The disease is most common between the fiftieth and sixtieth years. *Syphilis and pipe-smoking does not increase the predisposition to disease*; the process lasts, as a rule, about two years, and only exceptionally does it extend beyond that limit. In rare cases only are the lymph nodes free from involvement; the submaxillary gland is quite commonly invaded secondarily, and it is the exception to find the submental gland and deep cervical nodes involved when the primary lesion is in the tip of the tongue, the anterior portion of the floor of the mouth, or the middle of the lower lip. In malignant disease of the tonsils and pharynx, even in the earliest stages, there is a strong disposition to early invasion of the lymph nodes. Positive histological demonstration of the metastasis does not furnish grounds for an absolutely unfavorable outcome. At the time of the operation it is rare to find metastatic growths in distant parts. The result of operative measures depends chiefly upon the size of the tumor. Recurrence follows in 79 per cent. of the cases, but some cures have followed operation for recurrence. Repeated operations lengthen the patient's life; in 57 per cent. of the cases we find life lengthened by operative measures, the average period being 13.4 months. The mortality of the operation averaged 13 per cent., the mortality being higher the nearer the process approached the pharynx. Permanent results were obtained in 14.6 per cent. of the cases. In PROGRESSIVE MEDICINE, March, 1906, a review of a similar study by Cobb and Simmons was made. In comparing the two, we find that in Cobb's series the mortality was lower (8.5 per cent.), but the percentage of cures was less.

Melanosarcoma of the Hard Palate. We are accustomed to associate the places which normally contain pigment with the formation of melanosarcoma; thus the skin and eye are regarded as the usual seats of this type of tumor. That other areas are involved, although rarely, is shown by the contribution of Seidel,¹ who collected 12 cases in which a melanosarcoma arose from the hard palate. These tumors are interesting to the pathologist. In their metastatic manifestations they depart from the usual rule, in that the component parts of the primary growth are not reproduced; the pigment is absent. As to the technique of removal the cosmetic effect and the function of the face muscles must be considered in bilateral resection of the upper jaw for this disease. The author obtained a satisfactory result in his case by using Kocher's modification of the Dieffenbach-Ferguson-Weber technique. To avoid troublesome and alarming hemorrhage it is advisable to ligate the external carotid; the author prefers a permanent ligature, and does not believe it is ever necessary to ligate the common carotid.

¹ Deut. Zeit. f. Chir., November, 1906.

The prognosis is essentially as good in bilateral as in unilateral resection; the results were somewhat more favorable in those instances in which the operation was performed in two stages, one side being removed at a time. A considerable interval should elapse before the second operation is performed.

Cleft Palate. Of late years there has been a decided tendency to operate on cleft palate at an early age, although there is still considerable difference in opinion as to the proper time. This varies from the fifth week (G. Lane) to the third year of life (Berry). According to Murry,¹ who has performed over three hundred operations on cleft palate and harelip, it is correct theoretically to close the defect as early as possible, in order to get better results in speech, but experience has taught us that by early operation the character of speech has not been improved, the defective speech being due rather to the shape of the mouth and nostrils. Murry therefore prefers to wait until the second or third year of life, and covers the defect by a flap consisting of mucous membrane and periosteum. When the cleft is closed, the mucous surface faces the nasal cavity.

Glossitis is an inflammation of the tongue affecting one or both halves, occurring more commonly in males and appearing in either an acute or chronic form. Bennett² found 145 cases on record, and noticed that in 115 of this number the general health was recorded as good. The disease occurs at any age, and is apparently more common in the summer months. While many cases are designated as idiopathic, many etiological factors are given, such as exposure to wet and cold, or to great heat followed by rapid chilling, wounds and abrasions within the mouth, fracture of the inferior maxilla, local irritants; neighboring inflammations are also cited as possible causes. Pathologically the disease is characterized by an acute violent inflammation, chiefly in the intermuscular substance. Spontaneous resolution is the rule; exceptionally suppuration ensues and if drainage is not provided the infection may extend to the pharynx or larynx. In some cases the swelling may be so intense as to cause gangrene, leaving only the stump of the tongue. In 85 cases the entire tongue was involved at once; of these 66 recovered without and 29 with suppuration. There were 36 cases of typical hemiglossitis. At times the process may be said to be progressive, beginning on one side, receding, and then attacking the other. Prodromal symptoms may usher in the attack; the duration of the process from its incipency to the crisis varies from a few hours to ten days. The acute symptoms include rigors, fever, headache, sore throat, difficult and painful deglutition, foul breath,

¹ British Medical Journal, February 3, 1906.

² Washington Med. Annals, November, 1906.

swelling and protrusion of the tongue. As a complication should be mentioned the suffocation which is due to edema of or direct pressure upon the epiglottis. Severe hemorrhage from erosion, the extension of the process to the submental, the peritonsillar, or postpharyngeal regions may occur. The mortality of 145 cases was a little less than 3 per cent. The treatment is chiefly local; a prompt and deep incision should be made the entire length of the tongue, extending well into its substance. This is the most efficient measure and will be followed by rapid subsidence of the inflammation; if an abscess forms it should be evacuated and drained.

Syphilis of the Tongue. Atrophy of the base of the tongue as a diagnostic sign of syphilis was first recognized by Virchow. Its accidental finding in a case supposed to be a primary anemia led Potter¹ to investigate the subject in a large number of patients. Lewin and Heller found a smooth atrophy in 103 of 6583 autopsies (1.5 per cent.), and in 69 per cent. of the 103 cases there was definite evidence of syphilis; this large proportion points to an etiological relationship between syphilis and the smooth atrophy; 62 per cent. of the patients were over forty years of age. That this sign should be present more frequently in women than in men is due to the fact that primary and secondary syphilis is so often unrecognized in women and that they are the more often affected relatively speaking with tertiary symptoms. The atrophy persists longer than most of the other lesions of syphilis, and is due to an interstitial inflammation which terminates in a residual smooth atrophy in contradistinction to the ulcerative or gummatous process which terminates in cicatrices. Potter found that palpation was the best method of examination and he was unable to follow Lewin and Heller's classification into three stages. Although there is a marked difference between the plain, soft, velvety, cushion-like adenoid tissue at the base of a normal tongue, and the firm, hard, smooth base in a markedly atrophic tongue with a few shot-like glands, so many cases presented variations that Potter subdivided his series into: first, negative cases, those doubtful cases in which there was some hardening either of glands or mucous membrane; second, probable cases, and, third, positive cases. From his observations he concluded, first, that the normal condition of the base of the tongue is strong evidence of the absence of preëxisting syphilitic infection; secondly, that a typical atrophy of the tongue, in an individual below fifty, points to syphilis, and, thirdly, that a moderate or slightly marked atrophy of the base is of little or no significance.

Multiple Fibrosarcoma of the Tongue Treated by Operation and Trypsin. Primary sarcoma of the tongue is a rare lesion; of the 40 cases recorded, only 4 were of the fibrous type. In Wiggin's² case the lesion

¹ Boston Medical and Surgical Journal, January 26, 1906.

² Jour. of the Amer. Med. Assoc., December 15, 1906.

was so situated as to interfere with speaking, eating, and sleeping. The growth began in the back of the tongue several years ago; it was removed then, but recurred and of late had rapidly increased in size. At the second operation it was easily shelled out of its capsule and there was some improvement in the patient's general condition and relief from the annoying symptoms, but a few months later a tumor was noticed on the right side of the tongue. At the third operation nine separate encapsulated tumors of various sizes were shelled out. The microscopic diagnosis which was made, not without difficulty, was a fibrosarcoma. When the tumors again recurred, it was determined to try the administration of trypsin and pancreatic extract. Ten minims of trypsin, diluted with double its volume of sterile water, were injected into the cellular tissue of the patient's arm every other day, and a capsule of pancreatic extract was given an hour before each meal. The injections in two weeks were increased so as to be given daily in four-minim doses. The growth of the tumors was arrested apparently after the injections were begun; then they began to decrease slowly and, when the maximum dose was discontinued, could barely be palpated. The general health was markedly improved and no abscesses developed from the injections. In a short time the patient complained of headache, mental depression, and constipation, symptoms which Beard believes are due to the absorption of septic material from the degenerated tumors. These were relieved by the injection of amylopsin, but as the patient refused further treatment and the tumors began again to increase in size she passed from observation. The use of trypsin has been questioned chiefly by Pusey,¹ who believes that certain patients are made worse by the injections and that the pain and inflammatory reactions are decided disadvantages. The technique of the injections is as follows: After a few preliminary injections of small amounts, they should be given daily up to two ampoules for three or four weeks. Then one ampoule of the trypsin and amylopsin on alternate days for about four weeks. Lastly, one or two ampoules of injection amylopsin daily for four weeks or longer. If the injections are not well borne, they should be diluted and given at more frequent intervals.

Cancer of the Tongue. In no other structure is early recognition and prompt operative interference so important as in carcinoma of the tongue. The improvement in the results more recently obtained is due chiefly to these two conditions. The incipient lesion is frequently overlooked; either some associated lesion conceals its true nature, or frequently it is disregarded because its real significance is not appreciated. Butlin² divides the development of tongue cancer into three stages: (1) The first includes such predisposing conditions as leukoplakia, ichthyosis,

¹ Jour. of the Amer. Med. Assoc., August 11, 1906.

² British Medical Journal, May 19, 1906.

chronic superficial glossitis; these may last for years without inducing malignant degeneration, but must be regarded unquestionably as predisposing factors. (2) The second includes precancerous conditions, such as warty growths, thick plaques, ulcers which, while not at first cancerous, will become cancerous if not completely removed. (3) Actual cancer. The early lesions are too often observed for a considerable period before either the physician or the patient becomes aware of their gravity. The following incipient lesions have been observed by the author: (1) A flat, very slightly raised, smooth, red, glazed plaque, feeling like a thin piece of gristle in the surface of the tongue, not thicker than a dime, and looking and feeling just like a primary hard sore. (2) A white, warty growth, not ulcerated and scarcely indurated at its base. (3) A slight thickening and hardening of an old leukoplakic area, rather more perceptible to touch than to sight; probably an early stage of the first form. (4) A nodular plaque, red and commencing to ulcerate, with drawing-in of the surrounding tissues. Butlin states that a few years ago he would scarcely have made these diagnoses, still less would he have advocated excision and removal of the neighboring lymph nodes. That such procedures are now possible can be attributed directly not only to a more enlightened state of the medical profession, but also to the education of the public to the proper appreciation of cancerous conditions. As to the desirability of performing the operation at one or two sittings, the answer depends on the general condition of the patient, the extent of the disease, and the skill of the operator. Eisendrath¹ prefers to remove at one sitting both the primary growth and the nodes in carcinoma of the lip, and also in tongue cancer if the patient's condition will warrant the operation. It has been shown by Boyd and Unwin that the tumor cells may be disseminated to a greater extent if the secondary operation is done some weeks later, and they advise the removal of the nodes first. If the patient is too weak, however, to permit the radical operation, Eisendrath follows Butlin's plan, removes the tongue and waits until the patient can obtain sufficient nourishment and strength to stand the removal of the contents of the cervical triangles.

Chronic Inflammation of the Salivary Glands. Of the salivary glands the submaxillary is the most commonly involved in chronic inflammatory processes. Infection reaches the gland through the excretory duct, and sets up an active inflammation in the glandular acini, in the immediate neighborhood of the duct. Infection is more apt to occur when the vitality of the gland has been reduced, as by some constitutional disease. As to the formation of stones, Kroiss² maintains that they are always of inflammatory origin, and that traumatism, foreign bodies,

¹ Jour. of the Amer. Med. Assoc., September 20, 1906

² Beiträge z. klin. Chir., Band xlvii, Heft 2

and the glandular secretion play secondary roles. In a bacteriological examination of the calculi, Alexander¹ found the leptothrix—a result not surprising when one considers that the organism is present in the mouth of healthy individuals. The streptococci, he believes, are the organisms most frequently concerned in the production of salivary lithiasis. The symptoms of stone, such as colic and the glandular swelling, appear only when the stone obstructs the main duct. In chronic inflammations the gland is a hard tumor, but not very tender. Acute exacerbations are characterized by pain, fever, rapid swelling, and abscess formation in the periglandular structures rather than in the gland itself. Pus may be expressed from the duct. In the latent or subacute cases the condition may be relieved by extracting the stone or opening an abscess, but in the recurring or acute cases it may be necessary to extirpate the gland.

THE NECK.

Technique in Operations upon the Neck. Reference has already been made to Crile's method of controlling hemorrhage in operations upon the head and neck.

In operations upon the mouth, larynx, or pharynx ether is administered through a tube introduced into the pharynx. The pharynx is then tamponed so as to prevent the entrance of blood into the respiratory tract. This method of administering the anesthetic is especially useful in operations for cleft palate and for excision of the tongue. In laryngectomies the tube may be introduced directly through the tracheotomy tube. Special stress is laid upon the importance of accurate and painstaking dissections for the removal of malignant lesions. If such preliminary measures as have been recommended for the control of hemorrhage and for the administration of the anesthetic have been adopted, the operator may then proceed as quietly and as free from annoyance as one can in operations on other regions of the body. The all-important feature in the operation for malignant lesions is the removal of the malignant nodes and lymph-bearing tissues. Dissection for the removal of lymph nodes should always be begun at the base of the neck, thus establishing a bloc, and should include the removal of the internal jugular vein. It is impossible to remove all the malignant tissue without sacrificing the internal jugular vein, and inasmuch as the latter is freely compensated for, there is no added risk to the operation.

Larynx. LARYNGEAL CARCINOMA. The history of the radical operation for carcinoma of the larynx has been written in the past fifteen years. As a result of the elaboration of the technique, as well

¹ Revue de chir., May, 1906.

as the earlier recognition and more prompt resort to operation, the results are more encouraging. The diagnosis is greatly aided by the advances which have been made in the technique of laryngological examinations, as well as by an early histological examination of the suspected tissue. It is of the greatest practical importance to distinguish between the internal and external forms of cancer. The internal form, by far the more common, is confined to the true larynx, and frequently involves the vocal cords. The operative results are very much better in this type because it remains localized, owing to its poor lymphatic supply, and free from lymph-node infection for a greater length of time. Thyrotomy should be practised before attempting to remove the tumor in cases in which the process is not very extensive. The functional results are good: respiration remains unembarrassed; the voice may be preserved, at least in part, and at times may be surprisingly good, even if an entire vocal cord has been removed. In the 114 cases recorded since 1890, Bruns¹ found the mortality to be 9 per cent., recurrence 22 per cent., freedom from recurrence for at least one year 48 per cent. According to Semon 85 per cent. were free from one to thirteen years. Compared with Bruns' first 19 thyrotomies in which there was not a single cure, the present results stand in striking contrast. In preference to general narcosis Bruns uses a scopolamine-morphine injection, and infiltration anesthesia at the site of the incision. Anesthetization of the mucous membrane diminishes bleeding and prevents attacks of coughing. Endolaryngeal operations for malignant tumors are to be condemned, because without proper exposure it is impossible to determine whether the laryngeal wall is infiltrated, and it is more difficult to remove the entire growth. Furthermore, even if the operation is imperfectly done and malignant tissue is left behind, ultimate death of the patient will be hastened; incomplete operations for malignant disease are always followed by more rapid growth and metastases.

TOTAL LARYNGECTOMY FOR CARCINOMA. In Bogart's² case a man aged forty-six had had a papilloma of the vocal cord removed. Recurrence followed and because of the evident malignant character of the growth a second operation was advised and carried out on the lines of Keen's technique. The incision was made from the body of the hyoid bone to the episternal notch, the larynx and trachea exposed to a point just below the cricoid cartilage, the trachea divided at this point and immediately sutured to the skin. The larynx was then lifted up by the finger, dissected from the esophagus, and detached from the pharynx; the epiglottis, being free from involvement, was not disturbed. The upper margin of the pharynx was sutured to the tissues below the hyoid bone; the wound was closed from above downward and drained at

¹ Deut. med. Woch., September 20, 1906.

² Annals of Surgery, August, 1906.

its lower angle. On the fourth day the patient was up. He was fed in the Trendelenburg position and could swallow without difficulty on the sixth day.

EXTIRPATION OF THE LARYNX AND PHARYNX. In Nardmann's case the lesion was a squamous-cell carcinoma. The growth was so situated that the epiglottis was infiltrated and a view of the larynx impossible. The infiltration extended to the pharynx and metastasis was present in the regional lymph nodes. Nardmann¹ removed the larynx according to Gluck's technique, and in addition the infected glands, and several carcinomatous nodules at the root of the tongue. Later a plastic operation was necessary to close the defect. The patient gained rapidly in weight, and one-half year later could swallow without difficulty and could speak in audible tones.

Ludwig's Angina. The pathology of this acute infection, involving the mouth, throat, neck and submandibular and parotid regions, is not thoroughly understood. It begins usually with slight pains, chills, headache, and difficulty in swallowing. The swelling, first on one side of the neck, rapidly spreads beneath the chin, around to the neck on the opposite side, and over the larynx or parotid. In untreated cases spontaneous openings form on the inside of the mouth, and from them exude a thin grayish or reddish-brown liquid. Death results from systemic infection in from ten to twelve days. In investigating a number of cases of Ludwig's angina, Davis² found that the infection was due to a variety of organisms; sometimes it was a mixed infection, and sometimes a pure infection especially by the staphylococcus, streptococcus, or pneumococcus. The point of infection is usually a lesion in the throat or mouth, most frequently the teeth. No matter where the infection begins, it always spreads rapidly by direct contiguity, with no reference, and independently of the lymphatic circulation. The inflammatory process is situated beneath the deep fascia, so that the skin and cellular tissue are not involved. The density which the inflammatory exudate gives to the tissue causes the wood-like induration so characteristic of this disease. Death may occur early in the course of the disease as a result of edema of the glottis, or sudden heart-failure, later from exhaustion and sepsis. The salvation of the patient lies in early operative intervention; no doubt many lives have been lost by waiting for evidence of the formation of pus. Under primary anesthesia, a free incision should be made in the median line from the symphysis to the hyoid bone, and drainage introduced on either side. In the early stages immediate relief will follow this operative procedure.

Branchial Fistulas. The treatment of branchial fistulas by caustic applications and galvanism is a well-recognized procedure. It is usually reserved for those cases in which, for one reason or another, operative

¹ Zentralblatt f. Chirurgie, 1906, Nr. 1.

² Annals of Surgery, August, 1906,

measures are contra-indicated. In the case of a woman, twenty-two years of age, who had a fistula extending from the clavicular origin of the sternocleidomastoid to the upper border of the hyoid bone, Chevers¹ was successful in effecting a cure by the application of croton oil and galvanism. Into the tract, which had been previously cleansed, a strand of silkworm-gut dipped in croton oil was introduced. The application of the croton oil was alternated with the introduction of a silver-wire electrode, first with an annodal then with a cathodal current; the strength of the current was increased gradually from zero to five milliamperes, and then gradually reduced to zero again. According to the author, the cathodal current attracts hydrogen and alkalies, which by their irritative action and stimulative effect cause congestion and soften and liquefy the tissues. With the annodal current oxygen and acids are attracted, and these, having a tonic and astringent effect, harden and dry up tissues, and thus cause obliteration of the fistulous tract.

Congenital Cervical Fistula. A congenital fistula is by far the most common defect observed in the cervical region. While the branchiogenic origin is unquestionably applicable to lateral fistulas, the same cannot be said of fistulas centrally situated. v. Kisvanecki and Milleki, who have collected about one hundred and fifty causes of cervical fistula, deny the existence of a median variety and assert that they spring from the fistulas, the external opening of which happens accidentally to be situated in the median line. There is no doubt that this explains cases in which the sinus cervicalis becomes fused. Delkeskamp² had under his observation a patient, who had had a median fistula since birth. Situated over the thyroid cartilage, about three centimeters in length, the fistulous tract extended upward to the chin, and downward as far as the sternum; the orifice would not admit a probe of the finest caliber. The lower jaws showed a moderate micrognathia, but the *x*-ray examination did not reveal any failure of union of the two halves. The fistulous tract was easily extirpated, as it was not firmly adherent to the surrounding parts. The tract was lined with squamous epithelium, surrounded with an area of round-cell infiltration. This fistula was believed to be of congenital origin, due to an incomplete fusion of the sinus cervicalis; this would not account for the cicatricial tissue on either side from the sternum to the chin. Possibly the union of the branchial arches had been incomplete in the median line, leaving behind an epithelial cleft, which corresponded in its position and direction to the cicatricial cord. Inflammatory changes in the neighborhood of the fistula could easily account for the presence of scar tissue. The latter seemed to exert sufficient traction upon the lower jaw as to interfere with its growth; hence the micrognathia.

¹ *Annals of Surgery*, June, 1906.

² *Deut. Zeit. f. Chir.*, September, 1906.

Cervical Rib. The development, anatomical relations and symptomatology of cervical rib were discussed in *PROGRESSIVE MEDICINE*, March, 1905. Since that time a number of interesting cases have been reported. In Broadbent's¹ case the patient complained of a throbbing in the neck, and this was quite conspicuous on examination. On deep palpation the cervical ribs could be felt. There were no pressure symptoms. In the two cases which Thorburn² reported there were symptoms of pressure upon the first dorsal nerve, such as pain radiating down the inner side of the arm, and atrophy of the thenar and hypothenar muscles; these symptoms were relieved by removal of the ribs. In one of Murphy's³ cases the diagnosis was difficult because of the presence of an enlarged thyroid; an x-ray, however, proved that the pressure symptoms were due to a cervical rib; the rib and the right lobe of the thyroid were removed. There was in this case a small cervical rib on the left side also, which, however, had not caused any disturbance and therefore was not disturbed. Bilateral cervical rib is found in 67 per cent. of the cases, according to Beck; when unilateral, the right side is more commonly affected, as in 26 out of 41 cases collected by Riesman. Murphy calls attention to the rather frequent association of scoliosis with unilateral cervical rib. This is attributed by Garré to the fact that the cervical portion of the spinal column does not move as freely on the affected side, and to the disturbed function of the muscles of the neck. Cervical rib he believes is a congenital lesion, but the curvature does not appear until puberty. Hoffa attributes the scoliosis to the paresis and atrophy of the muscles, the result of pressure on the affected side, and to the overaction of the muscles on the sound side. The scoliosis associated with cervical rib is characterized by its situation in the cervical region, by the fixation of this portion of the spinal column, and by an attitude of the head and neck similar to that seen in torticollis.

Muscular Torticollis. In recent cases mechanical appliances or tenotomy will often suffice to correct the deformity, but in cases of long standing, associated with scoliosis and craniofacial asymmetry, more radical measures must be adopted. Thus, for example, Mikulicz recommended extirpation of the entire sternocleidomastoid muscle, to be followed one week later by massage and passive motion. In the majority of cases after operation the malposition of the head will have disappeared entirely; in the remaining cases the deformity is only partially reduced, the head being drawn either to the affected or to the sound side, but always moveable. Rousseau⁴ reported a favorable result following this operation. In those cases in which there has been recurrence after the operation, it has been attributed to the contrac-

¹ British Medical Journal, May 5, 1906.

² Proc. Med. Chir. Soc., 1905.

³ Surgery, Gynecology, and Obstetrics, October, 1906

⁴ Revue d'Orthopedie, January, 1906.

tures of fibrous structures, so that the operation to be complete, must include their removal. The craniofacial asymmetry is usually improved, at least in young patients, as is also the scoliosis; such amelioration cannot be expected, however, in those of more advanced years.

Tumors of the Carotid Gland. The carotid gland is an inconstant body, varying in length from four to seven centimeters, and situated at the bifurcation of the common carotid artery. It is situated somewhat posteriorly to the vessels, being more intimately related to the internal than to the external carotid artery. Keen and Funke¹ and Da Costa,² in reporting their cases, call attention to the following characteristic features: The affection is seen most commonly between the seventeenth and thirty-fifth years of life, the sexes being equally affected. When first noticed by the patient the tumor is about the size of an almond or a little larger, and when first seen by a surgeon has reached the size of a hen's egg. It may extend backward as far as the spine, upward to the base of the skull, and encroach upon the lumen of the pharynx. Because of its intimate relationship with the important vessels and nerves, and its rich blood supply, the removal of the gland is attended with much difficulty and a high mortality. Out of 26 reported cases there were 7 deaths, or a mortality of 27 per cent. The principal causes of death are pneumonia, caused by division of the vagus, and cerebral disturbances from ligation of the common or internal carotid artery. As there is usually no pain and no pressure symptoms, such as dyspnea or dysphagia, the diagnosis must be based upon the presence of a tumor of slow growth and variable consistency, situated at the bifurcation of the common carotid, associated with transmitted pulsation. The overlying skin is free and never discolored. Tumors of the carotid body may be divided into two classes: one of the more benign character, at least in its earlier stages, without involvement of the lymph nodes, and metastatic deposits; the other of a decidedly malignant type. Because of the serious nature of the operation, which involves the removal of such important structures as the carotid vessels and the vagus, one should attempt to differentiate between these two types. Keen is disposed to agree with Reclus and Chevassu, who advise operative interference only in those cases in which there is some serious functional disturbance, or in which there is positive evidence of malignancy.

Primary Sarcoma of the Hyoid Bone. This very rare lesion, the fifth to be recorded, was observed in a patient forty-five years of age, by Winslow.³ The primary growth began thirteen years ago and its removal was followed by recurrence. At the present time the patient was suffering from severe dyspnea which necessitated a laryngotomy in the crico-

¹ Jour. Amer. Med. Assoc., August 18, 1906.

² Annals of Surgery, September, 1906.

³ Maryland Medical Journal, October, 1906.

thyroid space. Subsequently a radical operation was performed which consisted in the removal of the hyoid bone, the larynx, and the base of the tongue. The relief was only temporary, however, inasmuch as the tumor recurred and the patient died three months later.

The Thyroid Gland. WOUNDS OF THE THYROID GLAND are usually stab wounds or wounds inflicted with suicidal intent, as with razors; because of profuse hemorrhage, which is due to the richness of its blood supply and the free anastomosis of its vessels, they demand prompt treatment. Even a small and apparently insignificant wound may produce alarming and at times fatal hemorrhage. Associated injury of the large vessels in the immediate neighborhood is a serious complication. Toussaint¹ was called to see a patient who had sustained a sword wound of the neck, and found him in a state of exhaustion. Upon opening the wound he found the left lobe punctured and the anterior jugular severed. The thyroid wound was closed with sutures and the patient recovered. The author has been able to find but 3 other cases; in 1 reported by Speyer, bleeding was temporarily arrested by a compressive bandage, but the patient died later from sudden hemorrhage. The other 2 cases, reported by Migons and Launay respectively, recovered, though the patients had lost a considerable quantity of blood.

THE FUNCTION OF THE THYROID IN RELATION TO INFECTIONS. It is not at all improbable that the thyroid secretion plays some part in the resistance offered by the organism against infectious diseases. Some have even gone so far as to say that hypersecretion of the thyroid affords the patient certain immunity against infections, especially tuberculosis. The iodine content of the colloid material is supposed to be the active specific agent. In infectious diseases the amount of colloid material and relatively speaking the amount of iodine is diminished. Marin² found that both men and animals in whom the thyroid was diseased or had been removed were more susceptible than others to infectious diseases. He believes that the swelling of the thyroid which is observed in general infections is an indication that the gland is stimulated to increased physiological activity by the toxins which the thyroid secretion is destined to neutralize. The diminution of resistance after infectious diseases is offered as a further argument in favor of the antitoxic action of the gland, and is attributed to its exhaustion after a period of hyperactivity. Marin has noticed in his tuberculous patients that those with normal thyroids respond much better to treatment than those with slightly or totally atrophied glands. Furthermore, he believes that Basedow's disease and tuberculosis are infrequently associated, the hypersecretion of the former immunizing the patient against the latter. The practice of using iodine or iodine preparations in surgical tuberculosis is cited as another instance of the specific action of thyroid secretion in tuberculous infections.

¹ Rev. de Chir., June, 1906.

² Presse médicale, September 26, 1906.

THE PARATHYROID GLANDS. Sufficient is known of the function of the parathyroids to caution surgeons against removing them during an operation for removal of the thyroid. The parathyroids are so small that it is not always possible to recognize them during the operation, but, knowing their location and relation to the thyroid, it should be possible in many instances to leave them undisturbed. They are flat, elliptical, or tongue-shaped bodies, quite soft, measuring from 6 to 8 mm. in one dimension by 3 to 1 mm. in the other. Under normal conditions they are of a light-brown color, though they are paler in anemic conditions and brownish-red when congested. Four in number, two are situated in relation with either lobe. The two lower glands are to be found near the edge of the thyroid, in close relation with the inferior thyroid artery, the two upper on the posterior surface of the thyroid, near the esophagus, and close to the superior thyroid artery. If, in ligating the thyroid arteries the ligatures are applied close to the gland, the operator should be careful to avoid injuring or removing them. There are cases, however, as in large goitres or in the presence of adhesions, when this may be extremely difficult if not impossible. As to the function of the glands MacCallum¹ calls attention to the following significant facts: parathyroidectomized animals develop all the symptoms of tetany; if this condition is looked upon as a form of intoxication, it may be the function of the parathyroids to neutralize certain poisons. At all events, if after bleeding the animal the blood is replaced with salt solution the symptoms for a time will disappear. In cases in which tetany is the result of stagnation of material in the digestive tract, the parathyroids undergo hypertrophy in order to neutralize the effect of toxic substances. Administration of the extract of parathyroid will prevent tetany in those cases in which the gland has been removed. After complete parathyroidectomy the life of an animal may be prolonged, though with difficulty, by the use of intravenous injections of large amounts of parathyroid material.

THE RESULTS OF THYROIDECTOMY. At the Thirty-fifth Congress of the Deutschen Gesellschaft für Chirurgie, Kocher² presented the results of his last series of 1000 thyroidectomies. During the past five years he has operated upon 3000 cases. In his last series the total mortality was only 0.7 per cent.; in 3 of the 7 fatal cases the thyroid was the seat of malignant disease. The mortality for the malignant cases, numbering 36, was about 8 per cent.; 8 cases of strumitis entirely recovered, and he lost but 1 case in 52 thyroidectomies for Graves' disease, the patient having died from postoperative hemorrhage. Of 904 operations for simple struma the mortality was 0.3 per cent. Of the 3 fatal cases, 1, a case of congenital cachexia thyreopriva, died of hemorrhage, 1 of pneumonia; the third fatal case had a bilateral palsy

¹ Brit. Med. Jour., November 10, 1906.

² Zent. f. Chir., 1906, Nr. 28.

of the recurrent laryngeal nerve and a marked myocarditis. As the result of his extensive experience, Kocher believes we are in position to say that the operation of thyroidectomy may now be performed without any danger of life, even in deep-seated growths, in those of large dimensions, or even in elderly people. His experience has taught him that the most important point to be borne in mind, in determining the question of operation, is the condition of the cardiovascular system. A thorough test should be made to determine whether or not there is any cardiac insufficiency. When the blood pressure is below normal or when there is failure of compensation, the operation becomes very much more dangerous. He protests strongly against the injudicious internal use of preparations of iodine and thyroid extracts, as these invariably lead to the so-called "goitre heart." The only complication that one should meet with after strumectomy is a mild expression of hypothyreosis. This should be avoided by leaving a sufficient amount of normal thyroid tissue behind; but if a more radical extirpation has seemed necessary, the effects will be counteracted by the administration of thyroid extract.

Speaking of the indications of operations, he includes those cases of simple struma which cause an increase in dyspnea and Basedow's disease. Both the internist and the surgeon as well are warned against considering the operative treatment of Basedow's disease as one of last resort. There is little to be said with reference to his technique. He still believes that preference should be given to local anesthesia, the exception being made only in those patients who are unable to stand a moderate amount of pain. In the treatment of the wound during the operation he prefers aseptic to antiseptic methods, and always employs drainage for the first twenty-four hours.

C. H. Mayo's¹ series includes 200 operations for uncomplicated goitres with but 1 death, a mortality of 0.5 per cent. Owing to the fact that he has had no fatalities attributable to the anesthetic, he prefers ether to local anesthesia. Large saline enemas he believes should be used after operations for exophthalmic goitre, inasmuch as they seem to delay the absorption of toxic substances.

ACCESSORY THYROID. Accessory or aberrant thyroids may be classified as true and false, or, according to their relation to the hyoid bone, as prehyoid, suprahyoid, and epihyoid. Of the latter division, or those aberrant thyroids situated between the hyoid bone and the foramen cecum, Murphy² has found but 39 cases. The author believes accessory thyroids to be capable of supplementary action, or actually assume the function of the thyroid. They are present at any age, occur usually in women, and may be factors in the production of menstrual disturbances. In a few instances acute infectious dis-

¹ Minnesota State Med. Jour., April 4, 1906.

² Jour. Amer. Med. Assoc., December 16, 1905.

eases and puberty have been considered exciting causes in the development of accessory thyroids. The glands vary in size from a cherry to an egg, are well encapsulated, soft, non-inflammatory, and are generally situated at the base of the tongue, either elevating the organ or penetrating its muscles. They are prone to undergo cystic degeneration, cause difficulty in deglutition, increased salivation, disturbance of speech, dyspnea, and occasionally are the source of hemorrhage. Medical treatment is unsatisfactory, but before surgical measures are resorted to the presence of a thyroid in the normal location should be demonstrated, for at times an aberrant thyroid may be the only one present and myxedema will follow its removal, this complication developing in 5 of the 39 recorded cases. The tumor when small may be removed through the mouth, or when large by the submental route. The prognosis is good, providing a normal thyroid is present, recurrence following in but 6 of the 39 cases.

CASES OF ACCESSORY THYROIDS SITUATED IN THE TONGUE. In 1 of 2 cases recently reported by Schwarz and Wikerhauser¹ radical operation was contra-indicated because of the absence of the thyroid gland'. The administration of thyroid tablets did not seem to have any influence upon the growth of the gland, which had attained the size of a small walnut. In the second case the gland, which was the size of an egg, interfered with deglutition by pressing upon the epiglottis. The gland was removed by a median transverse pharyngotomy, and was found upon examination to be a colloid struma, non-encapsulated, and infiltrating the muscular substance of the tongue. The operation was performed with the head in the Rose position, in order to prevent the aspiration of blood and disturbance of respiration.

SURGICAL TREATMENT OF EXOPHTHALMIC GOITRE. From our present belief that this affection is caused by a morbid condition of the thyroid secretion and especially a hypersecretion, it would seem apparent that removal of the greater part of the thyroid gland should cure the disease provided the organism in general has not been irreparably damaged. On the other hand, hyperthyroidism due to anemia, to vascular congestion from a heart lesion, or certain nervous states will not be benefited by operation, and mild cases of true Basedow's disease, where one might believe that the secretion is more altered in quality than quantity, should if possible be given the benefit of non-operative, especially serum treatment. The secret of success undoubtedly lies in the proper selection of cases for different methods of treatment. While operation should be advised at once in moderately severe Basedow's cases it should not be delayed too long even in the milder cases if non-operative measures fail, because, as Kocher emphasizes, one of the most potent causes for death after operation is a weakened heart muscle.

¹ Liecnicki viestnik, 1906, Nos. 6 and 8.

The occurrence of Basedowian symptoms in an old simple goitre, cyst, or adenoma is an additional indication for operation. Severe cases of exophthalmic goitre constitute a grave risk from the operative standpoint and make the operative mortality what it is (15 per cent.). Operation should be preceded, as Kocher advises, by prolonged quiet, phosphates, and a carefully selected diet until the more acute nervous symptoms disappear. Kocher's results may be tabulated as follows:

Cases operated upon	176
Deaths (5 per cent.)	9
Cases traced after operation	158
Cured	81 per cent.
Greatly improved	7 " "
Improved	10 " "
Died later	2 " "

Friedheim,¹ Curtis,² Schultze,³ and Shepherd⁴ report a total of 101 cases operated upon, with a mortality of 15 per cent. and with 70 per cent. of cures. These figures require further analysis because the high mortality is often used as an argument against surgical treatment. Thus, in Riedel's clinic only 1 death occurred in the mild and moderately severe cases, while the mortality of the severe cases was 28.5 per cent. of the 21 patients. Shepherd had 3 deaths, all in desperate cases, of 17 patients, and the Mayos⁵ in a very recent article record 9 deaths in 110 operations for exophthalmic goitre, 2 of which they state were in almost moribund cases. In regard to technique both Kocher and Riedel use local anesthesia, the latter claiming to have reduced his mortality from 12 to 8 per cent. by so doing. In severe cases Kocher performs the operation in several sittings, ligating one or more of the arteries first and later, when the symptoms have subsided, attempts the excision. Kocher also states that better results are obtained when ligating the vessels by taking care not to include the vein in the ligatures. The Mayos drain exophthalmic cases as freely as the most septic wounds; they, together with most American surgeons, prefer general to local anesthesia because of the results obtained by its careful administration. Careful handling of the thyroid and of the stump at operation is urged by all operators.

RÖNTGEN TREATMENT OF GOITRE. The beneficial effect of the *x*-rays in cases of exophthalmic goitre is attributed to their destructive action on the secretory epithelium of the gland, thus diminishing both quantitatively and qualitatively the amount of thyroid secretion. Thus Stegmann⁶ explains the satisfactory results he obtained in the treatment of 3

¹ Arch. klin. Chir., Band lxxvii, Heft 4.

² Annals of Surgery, March 1906.

³ Riedel's Clinic, Mitt. a. d. Grenz. Med. u. Chir., Band xvi, Heft 2.

⁴ Jour. Amer. Med. Assoc., Sept. 1, 1906.

⁵ Ibid., January 26, 1907.

⁶ Wiener klin. Woch., 1906, Nr. 3.

cases. Within three months the patients were restored to health. Some surgeons have resorted to a course of treatment with the x -rays preliminary to operation, with the idea that it decreased the vascularity of the gland. This course of treatment was believed to be particularly useful in cases of exophthalmic goitre. Slodowski¹ reports a case in which a great increase in weight occurred after the use of the x -rays, the patient gaining twenty-nine pounds in four months. Some of the symptoms, particularly the nervous phenomena and the hyperidrosis, were favorably influenced, while the exophthalmos, tachycardia, and tremor continued unaffected. The improvement noted continued only as long as the Röntgen therapy was used. Of the simple forms of goitre the best results may be anticipated in the parenchymatous struma, while cystic degeneration, nephritis, and pregnancy should be regarded as contra-indications. But Pfeiffer's experience² with the x -rays in 51 cases of goitre would seem to prove rather conclusively that they are of little value, and this is the opinion generally entertained. In only 2 cases was there a permanent diminution in the size of the gland, in 25 there was a transitory improvement, and in 22 no noteworthy change. However, the constitutional disturbances in some cases were decidedly improved. Attempts to find any histological changes in the gland, the result of the x -rays, have been negative.

EXOPHTHALMIC GOITRE AND OSTEOMALACIA. The association of these two diseases has been described by many authors, almost exclusively German, and observed only in goitrous districts. A case observed by Tolot and Sarvonat³ had a history of hyperthyroidism for years. Later shortening of the vertebral column and compression of the spinal cord was noted. The postmortem examination revealed a retrosternal in goitre and extensive osteomalacia. Since the exhaustive article of Hönnicke was published, with its collection of 33 cases, 11 more have been reported. Of this number the thyroid was diseased in 22, 7 occurred in goitrous families without having goitres themselves, and in 4 there was no relation at all to the thyroid. Because of the deformity caused by the bone lesion, it is frequently difficult to locate the thyroid, and in many cases the existence of a goitre is discovered only at autopsy. Practically all of Hönnicke's cases had evidences of hyperthyroidism, such as nervousness, vertigo, tremor, and tachycardia. Attention is called to the uncommon association of osteomalacia and other diseases, to its relatively common association with exophthalmic goitre, and lastly to the fact that osteomalacia prevails in that part of Europe in which goitre is so frequently found.

LIGATION OF THE THYROID ARTERIES. In parenchymatous goitres, in those in which there are little or no degenerative processes, in vascular strumas, and especially in rapidly growing goitres occurring in young

¹ Deut. med. Woch., August 16, 1906.

² Beiträge zur klin. Chir., Band xlviii, Heft 2.

³ Rev. de méd., 1906, No. 5.

people, Enochin¹ advocates ligation of the thyroid arteries. Shrinkage of the gland from connective-tissue overgrowth may be expected when the blood supply is cut off. Necrosis is not to be feared because of the extensive collateral circulation, traumatism is reduced to a minimum, and the danger of tetany and cachexia are less because of the gradual development of the atrophic process. In the majority of cases ligation is soon followed by a reduction in the size of the goitre, by the relief from the dyspnea and dysphagia.

RESECTION OF THE THYROID ISTHMUS FOR GOITRE. The isthmus of the thyroid gland measures from 6 to 18 mm. in length, and connects the lower parts of the inner borders of the lateral lobes. The isthmus is generally hypertrophied in strumous conditions and is then spoken of as the middle lobe. The extension of malignant disease from one lobe to the other, by way of the isthmus, has been observed. Resection of the isthmus in benign conditions was advocated by Sidney Jones in 1884, but the operation apparently never found favor, although several surgeons have reported favorable results following its use. It is claimed that after division or resection of the isthmus the lateral lobes rapidly diminish in size. The procedure is applicable only to recent parenchymatous goitres occurring in young people and those showing no evidence of degeneration or marked cystic transformation. Reclus² gives a favorable report in 2 cases in which he only divided and did not attempt to resect the isthmus. In both cases there was a reduction in the size of the lobes.

EXOTHYREOPEXY. The results following thyroidectomy are now so satisfactory that exothyreopecty is rarely resorted to. Occasionally we read of a case, as one reported by Blamel³ in which he seemed to think this operation was indicated. Because of a sudden and alarming asphyxia, a preliminary tracheotomy was performed; the right lobe of the gland was removed. When the left lobe resumed its normal position, symptoms of tracheal stenosis immediately recurred. The lobe was permitted therefore to remain outside of the wound, as this seemed to be the only method which would relieve the stenosis. A similar operation is reported from Hofmeister's clinic, in which the sternal muscles were united behind the thyroid in order to relieve the alarming pressure symptoms. The enlarged thyroid rapidly diminished in size until it was scarcely palpable.

ADENOMA OF THE THYROID GLAND. Simple parenchymatous goitre may frequently be treated by non-operative measures with safety to the patient, but the unilateral swellings of this gland, usually an adenoma, should always be viewed with suspicion and its removal advised. Blood-good⁴ presents a clinical and pathological study of adenoma of the thyroid

¹ Arch. klin. Chir., Band lxxx, Heft 4.

² Jour. des Praticiens, September 15, 1906

³ Bruns' Beiträge, 1906, Nr. 1.

⁴ Surgery, Gynecology, and Obstetrics, February, 1906.

gland and describes 25 cases in some detail. The age of onset varied from twelve to forty-two years and the duration of the tumor varied from two to twenty-nine years, in only 2 instances being less than three years, thereby making the differential diagnosis from carcinoma less difficult than in cysts. The presence of the tumor, pressure symptoms in one-third of the cases, and evidences of hyperthyroidism in several constituted the symptoms observed. In common with cysts, Bloodgood remarks of adenoma that "every asymmetrical enlargement of the thyroid gland in individuals over thirty years of age should be subjected to immediate operative removal."

MALIGNANT DISEASE OF THE THYROID GLAND. Müller and Speese¹ have collected all the cases of carcinoma (23) and sarcoma (10) occurring in the literature since 1902, and report 8 of the former and 1 sarcoma. In considering both forms of malignancy together, they found that there is an important relationship existing between goitre and the development of malignant tumors, and that there was a history of previous goitre in 53 per cent. of the cases. The disease is encountered more frequently in women (60 per cent.) than in men, and is relatively uncommon before the thirtieth year of life. About 53 per cent. of the cases occur between the ages of forty and sixty. When malignancy develops in a goitre, the growth remains for a longer or shorter time circumscribed, and then breaks through the capsule. The extracapsular growth is responsible for many of the symptoms and signs of the disease, the normal anatomical relations of the various structures in the neck being considerably altered and important organs infiltrated by the growth. Symptomatically a malignant process should always be suspected when a tumor of the thyroid appears suddenly in a patient over forty. If the surface of the tumor is irregular and dysphagia and pain are present, the diagnosis is almost certain. Hemorrhage from the trachea, pressure on nerves, cachexia, fever, fixity of the growth, involvement of the lymph nodes are later manifestations. The tumor occurs usually in the form of an adenocarcinoma, occasionally as a scirrhous, a squamous carcinoma, or a round or spindle-cell sarcoma. According to Ehrhardt, metastasis is observed in 85 per cent of the reported cases; the lungs and then the bones are involved in this order of frequency; of the latter, the skull and inferior maxilla are most commonly involved. There seems to be a tendency for the adenocarcinoma of the thyroid to form solitary bone metastases, and it has also been noted that in this variety of tumor the lungs are rarely affected. The disease should be considered as a very grave one; the percentage of deaths either from the operation or in a few months from recurrence is about 70 per cent.

THYROID GRAFTING. Thyroid grafting has usually been practised by the implantation method of Christiani. Small pieces of thyroid tissue

¹ Univ. of Penna. Med. Bull., June, 1906.

are inserted under the skin and in some cases their presence has been demonstrable three years after transplantation. In a case of a three-year-old cretan, Gautier and Kummer¹ having prescribed thyroid tablets, had to discontinue them because of nervous and gastro-intestinal complications. Four pieces of thyroidal tissue from an eighteen-year-old girl were planted in the axilla, and from this time on the child continued to improve both mentally and physically.

Payr² studied the effects, both morphological and functional, of the transplantation of thyroidal tissue into the spleen, first upon animals and then upon a human subject. The animals, from whom the entire thyroid had been transplanted to the spleen, lived from four to ten months; some of them died from infection, but most of them from some form of cachexia strumipriva, very few from tetany. Tetany developed, however, in some cases after the extirpation of the spleen. Morphologically the thyroid tissue was easily recognized, its color being in striking contrast to that of the splenic pulp; in size it was reduced from one-third to one-quarter. There was much less central necrobiosis of the transplanted tissue than is usually noted in other methods, and in some cases the necrobiosis was entirely absent. The degenerative processes were abundant, and the colloid content of the thyroid fairly consistent. The result of the application of this method in a child with symptoms of infantile myxedema were very encouraging. The tissue was removed from the child's mother and immediately transplanted into the spleen. Both patients recovered from the operation and in five months the child had grown twelve centimeters in height and was very much more intelligent.

ENDOTRACHEAL GOITRE. The presence of thyroid tissue within the trachea or larynx has been attributed to outgrowths from the thyroid gland itself, but the absence of any demonstrable defect in the tracheal wall has led to the advancement of other theories. The most plausible of these theories attributes the tumor to a proliferation of misplaced thyroid tissue. These growths are more common in females; as to age 12 of Enderlen's³ 15 cases ranged from fifteen to forty years. It is difficult, from the history of the case, to state the duration of these tumors, for they may have existed a long time without producing symptoms of sufficient severity to attract attention. Enderlen is inclined to believe that they begin to grow about the age of puberty. He found in 5 of the cases that the goitre was attached to the posterior wall of the larynx or trachea, and that in 6 it extended from that point to the lateral walls. In only 1 case was it situated anteriorly. The swelling is either round or cylindrical and has a broad base and a smooth mucous surface. The principal symptom is a varying amount of dyspnea, slight at the onset and gradually becoming quite severe. Laryngoscopic

¹ Rev. méd. de la Suisse romande, 1905, No. 6.

² Cent. f. Chir., 1906, Nr. 28.

³ Presse méd., September 15, 1906.

examination will confirm the diagnosis in any doubtful cases. Thyroid therapy has been advocated to check the growth of the goitre, but, as a rule, operative interference is required. This consists, after preliminary tracheotomy or a laryngotracheotomy, in extirpation of the growth.

THE THORAX.

Actinomycosis of the Breast. Primary actinomycosis of the mammary gland is rare; infection is secondary either to a pulmonary focus or to a lesion in the skin. Poiteau¹ has reviewed the cases in which the disease was met with between the ages of twenty-two and thirty-five. In the beginning the disease is represented by tumor formation, the second step is marked by peripheral inflammation and the third by ulceration. The tumor is often discovered by accident; as a rule, it is latent and does not cause spontaneous pain. On palpation it is hard, well circumscribed, and without any evidence of inflammatory reaction; the general health is usually good. At this stage a differential diagnosis between actinomycosis, tuberculosis, syphilis, or edema is impossible. Later on the nature of the affection may be recognized. The consistency varies; in some places it is hard, in some soft; the outline is less distinct, and the overlying skin is tense and red. At this stage sarcoma may be differentiated by its tendency to infiltrate the breast, although as a rule actinomycosis is overlooked and not considered because of its infrequency. The skin soon breaks down and the underlying abscesses discharge their contents through numerous fistulous openings. The stage of suppuration is protracted, as there is no tendency to granulation and repair. The borders of the ulcerated areas are irregular, undermined, and atonic. The pus varies in color, is granular, blood tinged, and contains fragments of necrotic tissue. The axillary nodes do not become involved—an important point in the differential diagnosis from cancerous affections. Ulcerating sarcomas always present a large ulcerating surface with thinning of the borders; the greatest confusion may arise in distinguishing actinomycosis from tuberculosis of the breast; both are met with about the same period of life, and fistulas are common in both. In tuberculosis the axillary nodes are involved. If any confusion or doubt exists, search should be made in the pus for actinomycotic granules, and treatment begun as soon as the diagnosis is established. Potassium iodide should be administered in large doses and Röntgen therapy tried; in the event of failure the breast should be amputated.

Mixed Tumors of the Breast. In estimating the relative frequency of tumors it has been found that the female breast is affected more often than any other organ. Of the tumors of the female breast 78.8 per

¹ *Pratique jour.*, Lille, 1903-1904, p. 337.

cent. are carcinomas and about 7.5 per cent. sarcomas. The so-called *osteoid sarcoma* or mixed tumor is, according to Wilms, very uncommon. In a case recently recorded by Hüter and Korrenstein¹ the tumor, the size of a fist and containing in the center a hemorrhagic necrotic mass, was removed from a woman thirty-seven years of age. The cyst wall was 4 cm. thick, easily differentiated from the glandular tissue, and was of a grayish-red color, and of various consistency. The axillary nodes were extensively involved. Several months after the breast was amputated recurrence was noted in the cicatrix; despite repeated operations, the tumor recurred and led rapidly to a fatal termination. Histologically considered, the tumor was composed of sarcomatous tissue with giant cells, rudimentary bone, and mucoid tissue, from which findings the authors conclude that the tumor developed from multiple *anlage* in the breast. The myxoma developed probably from cells of the mammary tissue, and the osteoid sarcoma from misplaced cells of the skeletal system, possibly from the periosteum of a rib. The myxomatous element was insignificant, being no larger than a cherry and remaining unchanged during the ten years that the tumor was known to exist.

Carcinoma of the Breast. Carcinoma of the breast is seen by the physician usually at two periods, either at the onset of the disease or after internal metastases have occurred. As Osler² says, the true nature of the case is often not discovered because the physician failed to make an examination, forgetting that internal lesions may have followed a small latent carcinoma. Direct extension through the chest walls to the pleura, secondary more rarely to the lung itself, is one of the most common sequels of carcinoma of the breast. Pleurisy with effusion may come on insidiously, with the only symptom an increasing shortness of breath. In other instances there are severe pains with evident signs of pleural involvement. It is not always easy to say how much effusion is present in the pleura, or whether it is of cancerous nature or not. Glandular metastases within the thorax are very common, and associated with all the distressing pressure symptoms of tumor. There may be no local recurrence and no physical signs, though, as a rule, the mediastinal tissues are involved and there is flatness on percussion and, not infrequently, disease of the sternum itself. The glands above the clavicle may be enlarged. Even mediastinal growths, with penetration of the manubrium, may undergo involution. Osler has seen but few instances of carcinoma of the lungs secondary to that of the breast. The lungs may be involved when the carcinoma extends from the costal to the visceral pleura. The peritoneum may be involved by direct extension, and metastasis to the liver is more common

¹ Virchow's Archiv, No. 183.

² British Medical Journal, January 6, 1906.

than to any other organ, but is not always associated with symptoms, and it is more commonly of postmortem than of clinical interest. Cerebral symptoms may be caused either by metastasis to the bones of the skull or to the brain itself. The symptoms of cerebral tumor may follow years after removal of the breast, or in a patient with an old atrophic scirrhus. The most distressing are the lesions of the spine. This complication is quite common and has been noted particularly in atrophic scirrhous cancer of the breast; the true nature of the spinal lesion is frequently not recognized. The symptoms usually occur in two stages. In the neuralgic stage the patient complains of pain in the back and side, indefinite in character and often of ill-defined position. There is general hyperesthesia. Gradually there is an increase in the severity of the pains, often so agonizing as to require morphine. The second or paralytic stage is of the spastic type; though occasionally quite rapid, more often the progress is slow, many months elapsing before the paralysis is complete. One of the most remarkable features in the history of carcinoma is the spontaneous involution sometimes met with in secondary tumors; there are cases on record in which multiple secondary tumors disappeared. Metastasis to the bones is fairly frequent, particularly in the long bones and those of the hands and feet.

THE TECHNIQUE FOR AMPUTATION OF THE BREAST is designed so as to avoid the following undesirable sequels: fixation of the arm and limitation of motion, venous stasis, lymphedema, neuralgia, and sensitive retracting cicatrices. These may be due to the direction of the incision, to the amount of skin removed, to the involvement of vessels and nerves in the cicatrix, to the malposition of the arm after operation to the dead spaces, and to recurrence. In order to avoid these complications Murphy¹ makes a flap rectangular in shape, the superior margin just beneath the acromion, the inner parallel to the fibers of the pectoral, and the outer parallel to the long axis of the humerus. If involvement of the skin is extensive it may be necessary to use semicircular flaps from the chest, back, or shoulder. These, however, should never be united so as to form a straight scar at the anterior axillary line. To cover the important structures exposed by the axillary dissection, Murphy uses the lower portion of the pectoralis major, after removing its aponeurosis. The muscle is freed from its costal attachments for a distance of two to two and a half inches along the sternal margin; the remaining two sides of the flap are made by splitting the muscle in the direction of its fibers, leaving the humeral attachment undisturbed. The flap thus formed is transplanted so as to cover the nerve, artery, and vein, and sutured at the apex of the axilla. The skin flaps are then sutured in the usual way. Immediately after the operation there is a fulness in the axilla, but this rapidly subsides as the muscle atrophies. The arm is

¹ New York Medical Journal, January 6, 1906.

dressed at a right angle to the body and held in position by an axillary cast extending over the side of the chest and out over the arm to the elbow, thus immobilizing the structures during the process of repair.

NEW TECHNIQUE FOR BREAST AMPUTATION. Jackson¹ begins his skin incision one and a half inches below the middle of the clavicle and continues it in a straight line to the lower border of the pectoral fold. From this point the incision is continued along the under margin of the pectoral fold to the chest, and then in an elliptical curve around the mamma. The pectoral muscles are isolated and the axillary contents removed before continuing the incision around. By ligating the larger vessels in the axilla before the breast is removed most of the bleeding is avoided. When the dissection is completed the quadrilateral flap of skin and fascia is stretched out by forceps and transferred inward so as to cover the defect. The lower portion of the pectoral fold is drawn up so as to obliterate the axilla and cover the axillary vessels. The following are the advantages of this procedure: (1) the flap covers the chest defect without tension and usually without the necessity of grafting; (2) the obliteration of the axilla prevents the formation of cicatricial tissue; (3) hemorrhage is reduced to a minimum; (4) the greater part of the operation is completed before the chest is exposed by removal of the breast, thus avoiding the exposure of an enormous area of raw surface, with the attendant shock. As soon, in fact, as the breast is removed the wound is ready to be closed.

Tansini² uses a flap which is composed of a considerable portion of the latissimus dorsi muscle; the circumflex artery, which supplies the flap, ensures its nourishment. The anterior margin of the flap is sutured to the anterior margin of the defect, the latissimus dorsi now occupying the position of the excised pectoralis major muscle.

COVERING OF SKIN DEFECTS FOLLOWING BREAST AMPUTATION. It is well known that the more radical the operation the better the results, and that local recurrence following extirpation of the breast for carcinoma is due to the non-removal of malignant tissue in the skin. The large skin defect formed by the radical operation has been filled in by various plastic procedures. Payr³ proposes a new "autoplastic" method in which the healthy breast is transplanted to repair the defect caused by the removal of the affected one. The incision around the breast is made so that the base of the flap is above and toward the median line. The breast is then detached and on its wide pedicle is transferred to the opposite side.

METHOD OF DISSEMINATION OF BREAST CANCER. Carcinoma is usually disseminated by the proliferation of cancer cells along the finer vessels of the lymphatic plexuses, and not, as generally believed, by

¹ Jour. Amer. Med. Assoc., March 3, 1906.

² Riforma Medica, xxii, No. 28.

³ Deut. Zeit. f. Chir., February, 1906, Nr. 31, Heft 2-4.

particles carried by the circulation. This process, according to Handley¹ may be a retrograde one. In this manner the parietal tissues become involved, the invasion following the line of least resistance. Dissemination occurs at first exclusively through the principal lymph vessels draining the organ. If the tissues are examined at points intermediate between the microscopic edge and the apparent edge of the primary growth, the cancer will be found penetrating the adjoining layers of skin and muscle to a considerable depth. The rapidity with which the lymphatics are invaded depends to a large extent upon the position and nature of the primary growth. In a hollow muscular organ like the urinary or gall bladder, according to Lockwood², there may be an interval of months or years, but in the mammary gland, which has no capsule, there is hardly any interval between the time of onset of the growth and its dissemination into neighboring lymphatics. There is little doubt that there is an anastomosis between the lymphatics of the two breasts, and this explains some of the cases of secondary involvement of the opposite breast.

Visceral deposits are most commonly the result of permeation along the fine lymphatics, which, piercing the parietes, connect the fascial lymphatic plexus with the subserous lymphatic plexuses of the pleura and peritoneum. Cancer cells thus find their way into the pleural and peritoneal cavities, implant themselves on the serous surface of the viscera, and give rise to visceral metastasis. Twelve per cent. of all cases of breast cancer are attended with abdominal metastasis without involvement of the thoracic organs. As Handley states, this may be caused by direct infiltration of the abdominal parietes in the epigastric region just below the ensiform cartilage. The modern operation does not take into account this avenue of dissemination. Inasmuch as the lymphatics leading to the abdominal parietes may be invaded quite early in the stage of the disease, they should receive as much consideration as those leading to the axilla.

LATE METASTASIS FOLLOWING BREAST AMPUTATION. While modern methods permit us to deal with a most extensive local lesion and with a reasonable hope of cure, yet in the presence of a single distant metastatic deposit we are helpless. In such an event, Curtis³ inquires, what course should be pursued? (1) Shall the primary growth alone be removed? (2) Shall both primary and secondary growths be removed? (3) Shall operation be declined? (1) In some cases the primary tumor causes symptoms of inconvenience or threatens life, and then should be removed if the operation is not too severe, even if the secondary tumor cannot be removed. (2) Both tumors may be removed when easily accessible and there are no signs

¹ Glasgow Medical Journal, December, 1905, p. 401.

² British Medical Journal, January 27, 1906.

³ Annals of Surgery, February, 1906.

of other deposits. Autopsy records have shown us that the primary focus may be limited and a secondary deposit arise which may reach a fatal size. (3) Curtis concludes that, as a rule, malignant disease will rarely require a combined operation for the primary and metastatic growths. The occurrence of secondary deposits, which gave no symptoms and could not be recognized at the time of operation for the original disease, but soon became evident afterward, is common. This fact emphasizes the necessity for a careful examination of the entire body before undertaking the removal of a malignant growth. We are still uncertain as to the length of time which should elapse without local recurrence before the patient can be considered free from the danger of any return. Formerly but few patients remained well for three years, but with our present methods the number who survive for long periods is great. This is indicated by the fact that there is a constant demand for a lengthened period which must elapse before a cure can be claimed, and five or even ten years has been suggested. If we consider both local and distant metastasis, a period of ten years is not too long, as shown by the following cases: one developed a secondary tumor of the mediastinum four years after removal of the breast, another remained well for ten years, a third developed symptoms of pulmonary deposits six years afterward, and bone metastasis was found five years after the breast amputation in a fourth case.

We may suppose that these late developments are independent growths which will account readily for some cases, or we may suppose that the cancer cells have been deposited before the primary tumor has been removed, and that they have lain latent or developed so slowly that they do not produce clinical evidences for many years. It is reasonable to suppose that the large mass of cells in the primary growths may keep in circulation some chemical bodies which unfavorably affect the resistance of the tissues, and that the removal of this factory of toxic substances might restore the normal resisting power and enable the tissues to destroy or encapsulate small deposits of cancer cells.

PATHOLOGY OF THE MALE BREAST. Finsterer¹ reviews a series of lesions of the male breast observed in one clinic during a period of twenty-nine years. The congenital and inflammatory diseases are of little surgical interest. The benign tumors were very rare, occurring much less frequently than malignant growths, usually a combination of fibroma and adenoma, although pure forms of both have been described. Lipoma, myoma, myxoma, and cystic adenoma were also met with. Carcinoma of the breast, of more importance because of its greater frequency, occurs in men at a more advanced age than in women; the average age was 55.2 years, the earliest in the twelfth and the latest in the ninety-first year. Traumatism seemed to play a distinct role in the excitation

¹ Deut. Zeit. f. Chir., September, 1906.

of the cancer, since many of the cases occurred in those predisposed by occupation to injury. Clinically the course was similar to that in the female. Pain was rare; fixation of the growth and ulceration occurred occasionally, but lymphatic involvement was quite constant. The prognosis is good; many cases lived for years without recurrence, although the number reported is too small to draw very accurate conclusions. Local recurrence has been met with, however, and rarely metastasis to internal organs. Sarcoma is extremely rare; the clinical picture closely resembles carcinoma, with the exception that it develops earlier in life, about the forty-fifth year. The tumor grows more rapidly, does not tend to undergo ulceration, and involves the lymph nodes less frequently than carcinoma; the prognosis, therefore, is more favorable. The principles governing the treatment do not differ from those applicable to the female breast.

Tuberculosis of the Thorax. As in tuberculosis of other parts of the skeleton, tuberculosis of the ribs and sternum is most commonly met with in youth and early adult life. Tuberculosis is the most common infection of these structures, typhoid infections being the next most common, and acute osteomyelitis comparatively rare. König¹ reviewed the findings in 110 cases. In this series it was noted that the ribs were involved ninety-three times and the sternum seventeen. The infection usually attacks the anterior aspect of the right side, and the fifth, sixth, eighth, and third ribs in the order named are the most commonly involved. The inflammatory process begins in the periosteum; there is caseation of the periosteum, causing a ragged, eaten-out appearance of the rib, or its outer layer may proliferate and lead to an ossifying periostitis. There is an almost uniform tendency for the inflammation to spread over the surface of the body so that neither the pleura nor the lung is usually directly involved secondarily. In some instances the abscess may point some distance from the site of the original focus, as in the abdominal wall. Associated tuberculous lesions of other organs are very common, as in König's series 50 had pulmonary tuberculosis, 20 tuberculous bone disease elsewhere, and 10 tuberculous pleurisy. The infection of the pleura is usually hematogenous in origin. Not infrequently there is a history of trauma and in some cases an acute infectious disease precedes the tuberculous lesion. When the lesion is quite superficial resolution may be affected by curettage; where the disease is more extensive, however, the diseased bone must be resected. Of 110 operations there were 84 resections with 62 recoveries and 11 recoveries out of 22 cases with less radical measures.

Wounds of the Intercostal Artery. This accident is a rare one, accompanies usually severe injuries to the chest, and is associated with hemothorax and pneumothorax. In the case referred to below, because of

¹ Archiv f. klin. Chir., Band lxxix, Heft 1.

the oblique direction of the wound, the tissues acted as a valve and prevented the entrance of air into the pleural cavity. A hemothorax was present, however, and at the operation Duff and Allen¹ found the divided ends of the sixth intercostal artery, which were exposed and ligated. According to the report the patient sustained the injury by falling through a glass door. While there was free oozing from the wound, there was not enough to suggest an injury to the intercostal artery. Three days later, however, signs of hemothorax were detected and the origin of the hemorrhage discovered at the operation.

Penetrating Wounds of the Thorax. In analyzing 407 cases of thoracic injuries Hainn² found 49 perforating wounds, that is, wounds in which the pleura had been torn. It is not always easy to determine whether this is an associated injury of the lung, although the latter may be suspected if there is hemoptysis. The frequency of the more important complications are tabulated as follows:

Nature of injury.	Contusions (31 cases).	Injuries with open wounds (18 cases).
Emphysema of skin.	15 cases.	7 cases.
Pneumothorax.	6 cases (always associated with hemothorax).	4 cases (always associated with hemothorax).
Hemothorax.	27 cases.	16 cases.

Infection of the pleural effusion was a rare complication; sometimes the bloody effusion, acting as an irritant itself, led to a pleural effusion or caused the formation of adhesions. There were 4 cases of "contusion pneumonia;" 10 cases ended fatally, but 4 of them had sustained other injuries, such as fractures of the skull. The treatment should be conservative, and consist in cleansing and tamponing the wound. When there is dyspnea, cyanosis, or displacement of the thoracic viscera, the pleural exudate should be aspirated. More radical measures will be needed only when the exudate is infected.

Resection of the Thoracic Wall. This operation is usually indicated in cases of malignant disease, whether it be primary sarcoma or carcinoma secondary to malignant disease of the mammary gland. Primary sarcoma usually springs from the ribs or their cartilage and may be either infiltrating or encapsulated. The latter may be enucleated with safety, while the former requires very extensive resection. Rixford³ recommends that an exploratory incision be made through the intercostal space at some distance from the tumor, in order that thorough exploration may be made of the inner surface of the ribs and some idea of the extent of the lesion be ascertained. In his experience in operating upon 6 cases, he did not find that the accompanying pneumothorax gave rise to any

¹ Lancet, September 29, 1906.

² Deut. Zeit. f. Chir., Band lxxix, p. 269.

³ Annals of Surgery, January, 1906.

alarming symptoms, and for this reason he does not believe it necessary to resort to either artificial respiration or to any of the various appliances devised to prevent pneumothorax. He did find, however, that respiration could be greatly modified and the tremendous lateral excursions of the heart and mediastinal tissues almost completely checked by covering the opening in the chest wall with a wet towel. In several of his cases he had an excellent exposure of the pericardium and the upper portion of the mediastinum, from which in some instances he removed enlarged lymph nodes. All of his patients recovered from the immediate effects of the operation, although in no instance was life prolonged. Deruginsky¹ reported a very extensive operation for the removal of a primary sarcoma of the pleura. The operation included the removal of a considerable portion of the chest wall and at least two-thirds of the diaphragm.

Torek² resected portions of the fourth, fifth, sixth, and seventh ribs and a portion of the underlying tissue for a recurrent sarcoma of the chest wall. In spite of the size of the pleural opening, respirations were in no way disturbed. The patient died twenty-four hours after the operation.

OSTEOPLASTIC RESECTION OF THE COSTAL ARCH. Owing to the unyielding nature of the lower portion of the thorax the vault of the diaphragm is most difficult of access. Various methods have been devised to overcome the difficulties, most of them consisting in resection of one or more ribs. Thus, Lannelongue proposed resection of the eighth to the eleventh costal cartilages or of their respective ribs. Mikulicz used a T-shaped incision and divided the seventh, eighth, and ninth ribs at their costocartilaginous junction, and two years later Marwedel described an operation somewhat similar, but less complicated. Meyer³ in 2 cases performed an operation somewhat similar to the plan proposed by Mikulicz. He used a T-shaped incision and divided the seventh costal cartilage at its sternal attachment and the seventh, eighth, ninth, and tenth costal cartilages at their junction with the ribs. This enabled him to obtain a very extensive exposure in an operation for the removal of the spleen. In some observations which he made upon the cadaver, he found that while the usual median incision could be combined with osteoplastic resection of the costal arch, the space gained by this method is not so satisfactory as was the oblique or T-shaped incision. This osteoplastic operation he thinks will prove especially useful in cases of injury to the liver and spleen, of injuries and diseases of the diaphragm and cardiac portion of the stomach. Inflammatory lesions such as hepatic or subphrenic abscess may be attacked also to better advantage through the chest beneath the complementary space of the pleural cavity after a resection of one or more ribs.

¹ *Annals of Surgery*, May, 1906.

² *Post-Graduate*, April, 1906.

³ *Jour. Amer. Med. Assoc.*, October 6, 1906

WOUNDS OF THE DIAPHRAGM. Injuries to the diaphragm result usually from stab or gunshot wounds and crushing forces. Rupture of the diaphragm occurs usually during expiration, when the muscle is relaxed, and most commonly on the left side, because here the attachments are not so strong. The condition is usually not recognized except at operation, because the symptoms are indefinite, especially when the rupture is small. There may be pain of a radiating character, vomiting, nausea, and sometimes diminution in diaphragmatic breathing. In 71 cases collected by Schloffer,¹ the lesion had not been suspected and was revealed only at an operation.

The most serious complications of wounds of the thorax, involving an injury to the diaphragm, are infection of the pleural and abdominal cavities, hemorrhage, and diaphragmatic hernia. Inasmuch as it is absolutely impossible without operation to determine the nature of the injury, expectant treatment should be condemned. There has been some discussion, particularly when diaphragmatic hernia was suspected, as to whether the transpleural or abdominal route should be given the preference. As a matter of fact in the majority of cases it will be necessary to open both the pleural and abdominal cavities, and it matters not which is opened first.

Caplescu² recommends that exploration should be made through the thoracic wound; this may be done with the finger, and if the diaphragmatic lesion is found the further steps of the operation are carried on by the abdominal route. Visceral wounds are sutured, the abdominal wound closed, and thoracic drainage established by resecting one or two ribs. He calls attention to the danger of delaying the operation until alarming symptoms make their appearance. From the presence of precordial pain, or pain at the site of the injury, the character of the weapon used, and the condition of the pulse, one can derive information which will be of assistance in determining the necessity of immediate operation. When the wound of the chest is associated with an injury to the lung, the indications for operative intervention are quite as positive. The most serious complication of this accident is hemorrhage, as Gangitano³ observes, and this will be arrested most promptly and efficiently by immediate suture of the lung.

Diagnosis of Mediastinal Infections. The recognition of the existence of a *substernal abscess* is not always easy; pressure symptoms such as dyspnea, pain, laryngeal irritation, palpitation, and cyanosis may appear with other mediastinal lesions. Edema and subsequent involvement of the anterior surface of the chest and sternum would suggest the existence of deep-seated inflammation. It was pointed out by Arx⁴ that in *leptothrix phlegmon*, with gas formation, percussion dulness is replaced

¹ Beiträge zur klin. Chir., August, 1905

² Revista de Chirurgie, February, 1906. ³ Riforma Medica, March 31, 1906.

⁴ Deut. Zeit. f. Chir., Band lxxxii, Heft 4 to 6.

by a tympanitic sound, and upon auscultation a peculiar loud crepitation is heard, synchronous with the heart beat. The skin over the sternum was not edematous, but the tissues in the neck were crepitant. In a case of fracture of the fourth left costal cartilage with hemorrhage into the anterior mediastinum and left pleural cavity, Arx observed three objective signs, which he regarded as of some diagnostic value: 1. Crepitation, as observed in the leptothrix infection, confined to the immediate neighborhood of the injury, due presumably to a separation of the connective-tissue spaces by the extravasated blood. There was no emphysema. 2. The apex beat one hour after the injury was unusually strong and seemed to be directly beneath the thorax. This was attributed to the effect of the hematoma pressing the apex directly forward against the thoracic wall. 3. A blowing sound easily heard and synchronous with the heart beat. It appeared suddenly three-quarters of an hour after the injury was received, while the patient was lying quietly in bed.

Diagnosis and Treatment of Esophageal Lesions. Esophageal lesions may be divided, according to Sippy,¹ into functional and anatomical, the former comprising both sensory and motor disturbances. The only sensory disorder of importance is hyperesthesia; this may cause some discomfort on swallowing. No lesion of the mucous membranes can be demonstrated with the esophagoscope, although the passage of the instrument causes some pain. Of the anatomical lesions, inflammation is rare, and ulceration seldom occurs except in association with carcinoma. If a peptic ulcer is present in the extreme lower third of the esophagus, hemorrhage is likely to be a conspicuous symptom. The first symptoms usually are pain or discomfort during the ingestion of food, and stenosis. As the latter increases, the patient may be conscious that the food is arrested at a certain point, and rapid eating causes a choking sensation and regurgitation. While it is easy to ascertain the seat of stenosis, it may be exceedingly difficult to determine the nature of it. In adults carcinoma is by far the most common cause, but all other causes should be considered before rendering a positive diagnosis. About 50 per cent. of all cases of esophageal carcinoma develop at the cardia, or at the point where it passes through the diaphragm. About 40 per cent. develop at the tracheal bifurcation and 10 per cent. in the cervical portion. Blood may appear in the stools. On examination with the esophagoscope a sloughing mass or nodular irregularities can be detected. Perforation of a bronchus will be followed by violent coughing upon the ingestion of liquids, a complication soon followed by bronchopneumonia and death. In this connection the case observed by Price and Gibb² is of interest. The communication between the esophagus and right bronchus must have been present for some time, yet there was no coughing or dyspnea, though food must have reached the lungs. Swallowing

¹ Annals of Surgery, June, 1906.

² Lancet, June 30, 1906.

was not interfered with, as the growth had caused no stenosis nor any other symptoms suggestive of an esophageal cancer.

Spasm of the lower end of the esophagus, if long continued, results in dilatation, and unless relieved is followed by emaciation and death. If the spasm is slight, regurgitation may not occur, provided the patient eats or drinks slowly. When dilatation of the organ occurs, the retained food is likely to decompose and cause ulceration of the mucosa. There is usually a sense of fulness and a feeling that food or drink is arrested before reaching the stomach. If cardiac spasm is present, several centimeters of liquid containing food particles may be regained from the esophagus hours after the ingestion of food. There may be little or no obstruction to the passage of a tube; this is an important diagnostic feature. Excitement, overwork, and worry are likely to increase the spasm.

RUPTURE OF THE ESOPHAGUS. Rupture of the esophagus has been defined by Fitz as a complete solution of continuity, extending through the walls of the tube and occurring during life. Rupture of the esophagus resulting from external traumatism is rare because the tube is elastic, mobile, and has a secluded position. The case which Lomax¹ reports sustained a crushing injury, the patient complaining only of pain in the mammary region; there was a slight cough, but no vomiting. The patient died eleven hours after the accident and the autopsy revealed an irregular laceration 2 cm. long and 2 cm. above the diaphragm. But one other case, due to external traumatism, is on record, although many are reported due to other factors. The most common causes are vomiting and traumatism within or without the tube. Spontaneous rupture may result from vomiting or from a severe shaking up of the body, but in these cases autodigestion is supposed to have caused a point of least resistance. Muscular action has been held responsible for some cases, although many contend that there must have been a preëxisting lesion in the esophageal wall.

It is well known that the esophagus is less protected against the action of the gastric juice than the stomach; this together with its poor blood supply may cause an intravital esophagomalacia. Disease of neighboring parts may by extension affect the integrity of the wall. The rent is usually situated in the lower third of the tube, and in practically all cases is in a longitudinal direction. External traumatism produces esophageal rupture through the action of pressure both without and within the tube. The squeezing or crushing results in forcing the contents out of the stomach in the direction of least resistance, *i. e.*, toward the esophagus. There is a temporary obstruction near the upper end of the esophagus, and when the tube is further distended by food and gas the pressure from without ruptures the esophagus at the point of least

¹ Medical Record, January 6, 1906.

resistance, or in the lower portion of the tube. The condition may be recognized by signs of collapse due probably to associated injury of the vagus (Voiss), cyanosis, hurried respiration, vomiting, emphysema, painful cough, and disturbance of deglutition. Because of the deep situation of the wound surgical interference is usually out of the question.

SURGICAL TREATMENT OF ESOPHAGEAL DIVERTICULA. While surgical intervention may be said to be the ideal treatment, palliative measures are safer and in certain cases have been attended with satisfactory results. In small diverticula, feeding by tubes will maintain the patient's nutrition and favor involution by preventing further distention of the sac. This treatment will have little effect, however, on diverticula of large caliber. Faradization has been advocated, although it is of doubtful efficiency, as the improvement may be attributable to the introduction of bougies.

The results obtained by surgical measures in 42 cases have been tabulated by Zesas.¹ Of the total number 34 were cured, 8 died from the operation; in 6 the esophageal wound healed by first intention, while in the remaining cases the fistulas closed in from four days to sixteen weeks. With slight modification the operation was performed according to v. Bergmann's suggestion: an incision was made along the inner margin of the sternocleidomastoid from the hyoid to the jugulum, the muscle retracted, the deep fascia split, the omohyoid muscle divided, and the superior thyroid artery ligated. The thyroid cartilage was drawn aside and the sac exposed by blunt dissection; the latter is facilitated if a sound is introduced into the sac. The sac was next extirpated, the wound in the mucosa closed with catgut sutures, and that in the overlying tissues with silk. The fistulas closed. Healing by first intention was interfered with by the irritation of mucus and food, the movement of the esophagus during swallowing, and especially vomiting following narcosis. Permanent tubes in the esophagus are objectionable because they cause irritation. Nutritive enemata cannot be depended upon for more than a few days, since the patients are already very much emaciated. In extreme emaciation a previous gastrostomy may be resorted to as a means of improving the patient's condition.

REMOVAL OF FOREIGN BODIES FROM THE ESOPHAGUS. For the extraction of foreign bodies which lie at or below the isthmus of the thyroid gland Hans² prefers the median incision. This approach will prevent the foreign bodies, which are situated higher up, from slipping down and escaping. He reports a case in which with this method he succeeded in removing a coin when other attempts had failed. After the removal of a toy bicycle, which was impacted in the upper portion of the esophagus, Rigby³ fed his patient through an esophageal tube. The transplantation of thyroid tissue directly over the esophageal incision

¹ Deut. Zeit. f. Chir., Band lxxxii, Heft 4 to 6.

² Zent. f. Chir., 1906, Nr. 34.

³ Annals of Surgery, March, 1906.

has been recommended by Navratil.¹ He believes the cicatrizing action of thyroid tissue may prevent leakage. His opinion is based upon animal experimentation. In 1 case in which the suture did not hold the thyroid flap prevented a mediastinitis. Thyroid tissue retains its vitality, and is therefore more desirable than muscle flaps.

Esophagotomy. Balacescu and Kohn collected 326 cases of external esophagotomy for foreign bodies from 1738 to 1903. Since this time Naumann² found 40 additional cases, 12 never having been reported. Of this number 22 were adults and the majority males. The wound healed on an average in one month. The left-sided method of Guattani was adopted in all but 1 case and in this the incision was made on the right side in order to remove a goitre. Dieffenbach has recommended an incision upon the right if the foreign body projects on this side. Catgut sutures are generally employed, as they give better results than any other material, and drainage should be resorted to invariably. The operation is complicated in some cases by strumectomy and in others by postoperative inflammation of the thyroid. This complication is met with only when the foreign body is situated in the cervical portion of the esophagus at the level of the cricoid or thyroid cartilage, where it may act as an irritant and cause congestion and infection.

TREATMENT OF ESOPHAGEAL STRICTURE. In the treatment of a series of cases of stricture of small caliber Bunts³ had made a series of graded, double-bulbed, olive-shaped bougies. On each staff there are two bulbs, one above the other, the first one being one size smaller than the second. After the first bulb passes the stricture the intervening portion of the bougie serves as a guide for the second bulb. With this guide one is justified in using a little more force than would otherwise be safe. For the introduction of the bougie the patient should sit upright, in a straight-backed chair, with the head thrown backward, and the bougie should be directed into the pyriform sinus at the side of the larynx. This will allow the bougie to slide into the esophagus without encountering the bodies of the cervical vertebræ or the cricoid cartilage.

AN ESOPHAGEAL POLYP. During the administration of the anesthetic the patient vomited and extruded a polyp from the mouth. The polyp was not removed then and the patient developed symptoms of obstruction, allowing of the passage of only liquid foods. The tumor seemed to be located at the sternal notch and attempts to cause it to be vomited again were unavailing. Cubbins⁴ performed a lateral esophagotomy and the tumor was found on the anterior wall of the esophagus attached to a pedicle a little to the left of the median line and just above the larynx and cricoid cartilage. The pedicle was ligated, the tumor removed, and

¹ Deut. Zeit. f. Chir., August, 1906.

² Ibid., Band lxxxiii, Heft 5 to 6.

³ Surgery, Gynecology, and Obstetrics, July, 1906.

⁴ Annals of Surgery, June, 1906.

the wound closed with packing. The tumor measured 16 cm. in length and 5 cm. in diameter and weighed 210 gm. These tumors have been described as fibromas and contain large amounts of fat.

ROENTGEN TREATMENT OF ESOPHAGEAL CANCER. This treatment has been used in malignant growths of the esophagus, and was followed in a case reported by Wendel¹ by temporary improvement. The patient has been unable to swallow anything except liquid food, and that with difficulty. The x-rays were applied to the cancer through an esophagoscope under local anesthesia. After eight treatments the patient was able to swallow solid food and the ulcerated area had cicatrized.

Injuries to the Thoracic Duct. While in some cases they may heal spontaneously, immediate operation is generally believed to be the safest plan of treatment in wounds of the thoracic duct. Our views as to the gravity of this lesion have been modified by recent contributions which have been made to the anatomy of the duct. It has been shown that after injuries of the thoracic duct a free collateral circulation may become established, and that in injuries to the cervical portion of the duct the outcome is not so serious because in this region the duct frequently divides into several branches and but one of these is involved in the injury. In operating upon a patient for the removal of carcinomatous nodes in the neck, Autrin² wounded the duct near its termination. Autrin made an attempt later to close the wound, but he was unable to find it. The patient died from exhaustion thirty-four days after the accident. The same accident occurred in a case reported by Unterberger.³ The wound was tamponed and closed in fourteen days. It is quite unusual to have the wound close in so short a time.

Thymus Stenosis. In a normal child the thymus body reaches its maximum at the end of the second year, after which time it gradually undergoes retrogressive changes so that by the twenty-first year the characteristic tissue has disappeared. Occasionally after the second year the thymus may grow to an enormous size, and this condition has been noted especially in leukemia and simple and exophthalmic goitre. Rehn⁴ calls attention to the various ways in which the thymus body may interfere with respiration. It consists of a right and left lobe, which are wedged in between the mediastinum and the large vessels; it lies upon the upper portion of the pericardium and the trachea.

The thymus rises and falls with each respiratory act, descending on inspiration and ascending with expiration. The more labored the breathing the greater is the excursion of the gland; and on forced expiration, as in crying or coughing, pressure is brought to bear upon it, forcing it out of the chest so that in children with a large thymus gland it may be recognized as a small tumor at the base of the neck. Thus the body

¹ Münch. med. Woch., 1905, Nr. 51.

² Rev. de Chir., vol. xxv, No. 7.

³ Beiträge zur klin. Chir., Band xlvii, Heft 3.

⁴ Arch. f. klin. Chir., Band lxxx, Heft 2.

may be said to act as a valve; if expiration is quiet the tracheal stenosis is insignificant, but if exaggerated it may press upon and narrow the trachea. If the body is very large or surrounds the trachea, it may exert continuous pressure upon it; if adherent to the mediastinum, expiration is interfered with. From observations made during operations it would seem that pressure is usually exerted upon the trachea just below the upper margin of the sternum, where the innominate artery crosses the trachea. This has been considered the area of greatest danger. Sudden death may be due to the pressure of an enlarged thymus, although this cannot always be proven. Paltauf suggests that death may be due to a reflex cardiac paralysis in patients of lymphatic constitution. In desperate cases tracheotomy will sometimes offer temporary relief, although it cannot always be relied upon. In several cases Rehn removed a portion of the gland without using a general anesthetic. Many favorable cases have been reported following removal of the thymus body, as in the case of Purucker and Ehrhart's case,¹ in which a thymus body was removed from a two-year-old girl who had suffered from dyspneic attacks for several months.

Sauerbruch's Pneumatic Chamber. It does not appear that Sauerbruch's apparatus has been very generally adopted. When the results of Sauerbruch's first observations were published a few years ago, it was believed that they would lead to greater activity in the surgery of the thoracic organs. Judging from the paucity of literature on the subject, it appears that the apparatus is used to a very limited degree. In a recent report from Sauerbruch's clinic² I find records of the first series of operations which he performed in the negative chamber. In two operations for resection of a portion of the thoracic wall the results were satisfactory. His experience with operations upon the lung were very unfortunate; only 2 of 8 cases were benefited; 1 patient operated upon for a penetrating wound of the heart died from hemorrhage before the completion of the operation. In 5 of the cases in which the operation was performed for the relief of *esophageal stenosis* the results were disappointing. In this connection Sauerbruch does not believe that an attempt should be made to effect an anastomosis between the stomach and esophagus in cases of carcinoma; if reserved for benign stenosis, there is no reason why such a procedure should not be effectual.

Bronchoscopy. The methods and technique of bronchoscopy have been discussed fully in previous numbers.³ Mayer⁴ cites 5 cases and endeavors to make clear the indications both for immediate action or reasonable delay. The first case had an orange-seed removed by lower bronchoscopy; the child was cyanotic, coughed distressingly, and would have

¹ Arch. f. klin. Chir., Band lxxviii, Heft 3.

² Münch. med. Woch., 1906, Nr. 1.

³ PROGRESSIVE MEDICINE, March, 1905 and 1906.

⁴ Jour. Amer. Med. Assoc., November 10, 1906.

developed severe pulmonary complications had not relief been afforded promptly; it was only ten months old and is the youngest patient thus far recorded from whom a foreign body has been removed with a bronchoscope; 1 of the 5 patients died, and in this case the foreign body had been inhaled two days previous to admission; the body was not only solid, but of the kind that swells, and produced increasing pulmonary obstruction. Mayer believes that bodies may be left *in situ* for some time without producing symptoms immediately dangerous to life, but the presence of a solid foreign body, or one that, as a tendency to swell, occluding the entrance of air into the lung below it and causing signs of increasing dyspnea, should be regarded as an indication for immediate operation.

Guizez¹ reports a case in which a fifty-centime piece had been inhaled five weeks before the patient was seen. There was a painful point beneath the right breast, more marked on deep inspiration, paroxysmal cough, and mucopurulent expectoration. The x-rays revealed the coin to the right of the vertebræ, in the region of the right bronchus. Under local anesthesia a bronchoscope was inserted with considerable difficulty and the coin extracted from the right bronchus. The diagnosis should be made from the history of the case and the urgent symptoms indicative of pulmonary obstruction. Careful auscultation, in the event of a solid body being present, may reveal absence of breathing below the point of occlusion, with dulness and retraction on the affected side. In incomplete obstruction a musical sound on expiration is heard, a symptom observed in 2 of Mayer's cases. This writer, in discussing the advantages of operative measures, inclines toward tracheotomy because it lessens the time of the operation, avoids possible injury to the laryngeal membrane, has the distinct advantage of permitting a larger tube to be inserted, and brings us nearer the foreign body for the purpose of manipulation.

Lung Surgery. The admission of air to the pleuræ, with the resulting collapse of the lungs, has been the greatest barrier to operations on the thoracic viscera. Consolidation may result if the lung does not expand. To prevent collapse of the lung we must take into consideration certain physical, physiological, and pathological phenomena. In a series of lectures Macewen² presents some very interesting and original observations along these lines. According to his teaching, pulmonary expansion is due largely to molecular cohesion and capillarity, and when air is present in the thoracic cavity for any time the pleuræ become dry, and if extra fluid is secreted, the nature of secretion is altered, and the natural cohesiveness is more or less affected. In such cases, if the *pneumothorax* persists he advises opening the cavity by resection of a

¹ Presse médicale, July 14, 1906.

² British Medical Journal, July 7, 1906.

rib, seeking for the site of the injury, and suturing the visceral to the parietal layer of the pleura. The two pleural surfaces are then brought into apposition by firm pressure on the chest and diaphragm; cohesion will again result between the two surfaces and the pneumothorax disappear. By the restoration of this physiological condition reëxpansion of the lung can be induced. The deleterious effects of dry pleuræ should be borne in mind in all operative procedures and certain preventive measures adopted; blood will act as a lubricating fluid and sterilized water has been used with satisfactory results. The action of a collapsed lung, in an artificially produced pneumothorax is of importance in explaining the attending shock. When one lung collapses, the heart and vessels are deprived of some support. Not only do these structures lose their support, but they, together with the mediastinum, are displaced. These factors, together with the compression of the lung and the consequent impairment of the respiratory exchange of gases, are regarded by Macewen as responsible for the shock. In his opinion the cardiac displacement is the primary cause.

Tiegel,¹ as a result of his experiments on animals in *Sauerbruch's negative pressure chamber*, concluded that, in order to prevent the entrance of air and the resulting pneumothorax, the line of suture must be air-tight. To fulfil these conditions he found that but few sutures were necessary. His technique is as follows: a skewer of magnesium is introduced into the edges of the wound and then anchored with a continuous suture of fine silk, which includes the magnesium skewers. Coagulation and obliteration of the stitch-holes is favored by dipping the sutures in a chloride of iron solution. Magnesium was found to be perfectly harmless in the tissues. Fink² records an interesting case of *pulmonary hernia* following a stab wound. A mass of lung tissue about the size of the palm of a man's hand protruded through a three-inch incision between the ninth and tenth ribs. The costal pleura was cut in shreds and the lung was denuded of a small portion of its visceral pleura; there was little hemorrhage and no crepitation in the protruding portion of the lung. The mass was ligated with interrupted silk ligatures and removed, in order to avoid infection. The subsequent history was uneventful; there was no rise in temperature, and the lung expanded to its normal dimensions. The adhesions between the parietal and visceral surfaces which formed at the time of the operation and the plugging action of the hernia prevented, in the author's opinion, the formation of a pneumothorax.

OPERATIVE TREATMENT OF CAVITIES IN THE LUNG. In the treatment of pulmonary cavities the situation is of considerable importance, for lesions at the base or near the surface are of easy access, and there-

¹ Münch. med. Woch., lii, No. 46.

² Indian Medical Gazette, November, 1906.

fore more easily operated upon than those which are deeply seated toward the root of the lung. Surgical interference with the lung, according to Tuffier, demands exact diagnosis, bearing upon the existence, the nature, the seat, the shape, and the number of the lesions in the affected lung; upon the state of the pleura, the opposite lung, and the general condition of the patient. Berry¹ divides the methods into three groups: (1) Intrapulmonary injections, by which he means various antiseptic substances have been introduced directly into cavities; they have been of little value and are attended with a certain amount of danger. (2) Excision of diseased portions of the lung. This has been applied chiefly for incipient tuberculosis. While the technique has been improved decidedly by the studies of Sarpert, it must be admitted that with our present knowledge and experience it cannot be endorsed. A considerable risk is taken for very uncertain results. (3) Incision and drainage; this is the only surgical method of any real practical importance. In the cases of abscess and gangrene following pneumonia the cavity should, as a rule, be opened if the diagnosis can be made. The patients are usually extremely ill, and the conditions extremely unfavorable. Despite this, Garré and Sultan found in a series of 96 cases that about 80 per cent. recovered. It is important that the lung should be fixed by sutures to the chest wall, otherwise the lung is likely to recede and give rise to pneumothorax. The results in bronchiectatic cavities are far from encouraging, because by the time such a cavity is large enough to be recognized the patient's condition almost forbids operation. According to statistics, which cannot be accepted as an absolutely trustworthy source of information 57 operations were followed by 21 deaths. The indications for operating on tuberculous patients are very limited, *i. e.*, a single large cavity, especially at the base, providing the rest of the lung is healthy, and the general condition of the patient is good. Berry describes in detail a successful operation by Sarpert, who drained a cavity in the right lung, the size of a hen's egg. The operation was carried out with ease, caused little hemorrhage, and was followed by a diminution in the amount of expectoration and cough and less febrile reaction.

Lung Complications after Anesthesia. In American literature there has been little evidence of any widespread interest in the pulmonary complications after operations and anesthesia. At least one's attention is much more frequently directed to this important subject by foreign authors, particularly the Germans. We have, in an article by Armstrong, the tabulated results of a series of 2500 cases, in most of which the Clover inhaler was used; 55 (2.2 per cent.) of the cases developed some pulmonary lesion, and of this number 32 (1.28 per cent.) were examined postmortem. The youngest patient was one

¹ Clinical Journal, June 6, 1906.

year old, the oldest seventy-eight; there was no sex predisposition; 35, *i. e.*, more than one-half, occurred during the cold months of the year, the pulmonary symptoms beginning within forty-eight hours after the anesthetic had been given. A septic focus was present in 37 cases prior to the development of the pulmonary complications, and 8 of these had emphysema. After reviewing the other complications which existed before or followed the operation, the author concluded that ether itself was not the essential but only a contributory factor. In all probability aspiration plays the most important part, and there is strong disposition to pulmonary complications following abdominal operations.

The relations of operations upon the abdomen to pulmonary complications has been studied by Bibergeil,¹ who found 283 cases in a series of 3909 abdominal sections. Pneumonia developed in 135 or 3.5 per cent. of the whole number; embolism in 12; infarcts in 9, with 1 death; bronchitis in 83, abscess of the lung in 12, pleuritis in 15, and empyema in 13 cases. The lobular types of pneumonia are attributed to auto-inoculation, the infective agent entering the lungs by aspiration. Shallow respiration, to avoid pain, inadequate expectoration whereby irritant material is retained; the lowered vitality of the patient, and the depressing effect of the operation must be regarded as the important contributory factors. Lobar pneumonia is usually that form of the disease in which the organisms enter the lungs by aspiration. As prophylactic measures the mouth should be disinfected; the stomach washed out, prior to operation on the alimentary tract; the patient should be carefully guarded against cold and exposure; the temperature of the solutions applied to the abdominal contents should be 113° or 122° F. In addition to this the patient's position should be frequently changed; he should be urged to take deep respirations, and bandages should not be applied in such a way as to embarrass or impede free respiratory movements.

Pleural Effusions. Aspiration of pleural effusions is so frequently resorted to that the possible dangers are apt to be overlooked. In addition to infection, the following complications have been observed: pleuritic urticaria, albuminous expectoration, sudden death from exploratory puncture and pneumothorax. With reference to sudden death, Sears² says that while this accident has occurred a number of times after the removal of even moderate amounts of fluid, it is not usually known that it may also result from a simple exploratory puncture. In the majority of fatal cases the lung was solid, and the syncopal symptoms are, according to Russel, due to afferent impulses conveyed to the medulla along the vagus nerve; the terminal fibers of the vagus already irritated by the inflamma-

¹ Arch. klin. Chir., lxxviii, Nr. 2.

² Amer. Jour. Med. Sci., December, 1906.

tory process are subjected to further insult by the needle. Hemorrhage from the wounded lung has complicated some cases.

Sears records 4 cases of *pneumothorax* following thoracentesis and believes that this accident is more common than the number of recorded cases would indicate. A great majority of the cases recover, the lung wound heals readily, and the air is rapidly absorbed. It is very commonly said that the pleuræ, as compared with the peritoneum, offer less resistance to infection because so many infections occur after thoracentesis even when performed with the utmost attention to cleanliness and disinfection. Redner has demonstrated, however, that there is a high resisting power in the pleuræ, which, for example, has resisted the injection of 1 cm. of a bouillon culture of staphylococci, 0.3 cm. of which was fatal on intravenous injection. The natural resistance of the normal pleura according to Noetzel¹ is deprived, however, when the pleural cavity is opened, and pneumothorax develops.

EMPHYEMA. In cases of *empyema* Braun² prefers resection of a rib to simple puncture and drainage. Local anesthesia may be used if there is much weakness, dyspnea, or cardiac depression; ether should not be used at all if there is a co-existing bronchial infection. If a *bilateral empyema* is present, he waits until the lung on one side has expanded before draining the other side. Leys³ thinks that most acute cases of empyema can be treated by simple incision, while resection of the rib should be reserved for patients with flat chests and narrow interspaces, and for cases of chronic empyema.

Empyema Produced by a Foreign Body. In Grunert's case⁴ an empyema developed for which a rib was resected and drainage introduced. During the course of his illness the patient had had a severe pulmonary hemorrhage. He improved decidedly after the operation, but the fever continued and the fistula would not heal. In curetting the fistulous tract Grunert recovered from the wound an ear of rye 5 cm. long, and the wound promptly healed. The patient afterward remembered having swallowed this foreign body some time previously while at work; he experienced some pain in the region of the left shoulder, which was probably the onset of his pleuritic infection.

Paracentesis of the Pericardium. The introduction of an exploratory needle into the pericardial sac is a well-recognized diagnostic procedure, practised both by the physician and surgeon. A number of interesting points with reference to the technique, together with the indications for the operation and its results, are discussed by Sears.⁵ There is some difference of opinion as to the point where the needle should be introduced. Some prefer a point either close to the margin of the sternum or two inches from it in the fourth or fifth interspace, while Sears prefers to introduce

¹ Zent. f. Chir., 1906, Nr. 28.

² Deut. med. Woch., xxxii, Nr. 14.

³ Amer. Jour. Med. Sci., July, 1906.

⁴ Med. Klin., 1906, Nr. 43.

⁵ Boston Med. and Surg. Jour., November 22, 1906.

the needle in the fifth or sixth interspace, as far out as the anterior axillary line. The needle is then pushed inward toward the heart until fluid is withdrawn.

Sears chooses this method of approach because there is less danger of plunging the needle directly into the heart, since it has been shown in many cases that even in the presence of a large effusion the heart may lie very close to the anterior chest wall. His personal observations include a series of 13 cases in which positive results were obtained in 8. The first insertion of the needle was not always successful, in some cases two or three attempts having been made before fluid was discovered. In the unsuccessful cases the needle was introduced in the fourth right interspace, three times in the fifth right, and the fifth left close to the edge of the sternum and beyond the limit of dullness, once each. The greatest number of successes as well as the largest amounts of fluid were obtained through the fifth or sixth interspace at or beyond the limit of dullness. There was but 1 case in the 13 in which the question of possible harm was raised, and then only because death occurred within twelve hours. The patient was very ill with pneumonia, and with the hope of relieving pressure the needle was introduced, but with negative results. The autopsy showed that the heart was struck by the needle, and it is possible, though hardly probable, that death was hastened by it. A fairer estimate of the danger of this procedure may be gathered from a series of 100 cases in which there were but 2 fatal results, and 1 of these was very doubtful.

As to the indications for exploration, Sears includes those cases in which in spite of treatment a large effusion persists, in which in consequence of the effusion the patient's strength is failing, or from extreme dyspnea the patient's life is in danger. He discusses the question as to whether the exploration is more likely to lead to the formation of adhesions or whether, as has been suggested, the prolonged separation of the two inflamed surfaces by fluid may prevent adhesions by giving time for the inflammation to subside before they can come into apposition. If, as it is claimed, aspiration prevents the development of adhesions in pleurisy, there is no reason it should not have the same effect in pericarditis. The relative value of paracentesis as a curative measure cannot be determined until the end results of a sufficiently large series of cases can be compared. Sears believes, however, that the attitude of the profession generally has been too conservative, although there seems to be a reaction in the direction of the more radical treatment. In the past there has been a tendency to regard the operation as one of last resort in desperate cases, and the result in these has brought the operation into more or less disrepute. Where aspiration fails, or where the fluid rapidly accumulates, or where there is a strong probability of pus, the establishment of a permanent opening rather than an exploratory puncture is the operation of choice.

Suture of the Heart. I have continued the practice of former years, of collecting and tabulating all the cases of heart suture reported during the past year, so that we now have a complete series including a total of 118 cases.¹ During the past year 16 cases were collected. Comparing the statistics of last year with those of this year's summary, I find no difference in the percentage of recoveries or deaths. The mortality in both is 38 per cent. and the recoveries 42 per cent. When compared, however, with the results of palliative treatment, this makes a very creditable showing. Fischer collected 334 cases treated expectantly, and found that but 11 per cent. recovered. (Compare with percentage of recoveries after suture of heart.) While drainage is objected to by some on the ground that it may cause irritation of the pericardium, the mortality, as a matter of fact, is much higher in cases in which the pericardium was closed without drainage:

	Deaths.		Per
	Cases.	Per cent.	cent.
Pericardium closed without drainage	42	59	40
Pericardium drained	23	8	20

The mortality in wounds of the right is higher I think than in those of the left ventricle, because of associated injuries to the pleura. Of the 16 new cases the left ventricle was injured 7 times, the right ventricle 9 times.

SUMMARY.

	Cases.		Per
	Cases.	Per cent.	cent.
Total number of cases	118		
Number of deaths	69	58	
Number of recoveries	49	42	

	Cases.	Died.	Rec.	Mort. Per cent.	Recovered. Per cent.
Right ventricle	42	29	13	69	31
Left ventricle	55	28	27	51	49
Right auricle	3	1	2	33½	66½
Left auricle	1	0	1		100
Left apex	6	3	3	50	50
Coronary artery	1	1		100	
Septum between	2	1	1	50	50
Seat of wound not stated	7	5	2	63	37

The following is a record and summary of cases occurring during the past year: Travers² case sustained a wound of the right ventricle, in which the fragments of rib were embedded. Removal of the bone caused a terrific gush of blood which was controlled by the operator thrusting three fingers in the heart wound; the fingers entered the cavity of the heart and apparently encountered the tricuspid valve. Three sutures were inserted, a finger being withdrawn as each was passed, and then ten sutures were passed through the muscular coat. Death followed

¹ PROGRESSIVE MEDICINE, March, 1904, 1905, and 1906.

² Lancet, September 15, 1906.

on the eleventh day: the autopsy revealed union of the wound except at one small point where there was some necrosis. Death was attributed to the interference with the heart action caused by a clot on its anterior surface.

Dalcetti¹ discovered a wound in the right ventricle a centimeter and a half long. When the heart was exposed it had ceased beating and the patient was apparently dead. Three sutures were hastily inserted and the heart replaced; after a course of vigorous massage it resumed beating. Death followed on the eighth day from peritonitis and mediastinitis.

Gobell² records a gunshot wound of the left ventricle, inflicted by a revolver. The anterior wound, 2 cm. long, was closed by four sutures; the posterior at the point of exit of the bullet, measuring 2 by 3 cm., with five sutures. The patient recovered and is 1 of 5 successful cases following a bullet wound of the heart.

A successful result was obtained in Tschernischowski's³ case of wound of the left ventricle; the wound was closed with three silk sutures.

Wendel⁴ closed a wound in the left ventricle with catgut and drained the pericardium. Pericarditis developed, but the patient recovered.

Gibbon⁵ found a wound of the right ventricle near the auriculoventricular groove; the bleeding was readily controlled by digital pressure. Four sutures of chromicized catgut were used to close the wound. The introduction of the sutures was greatly facilitated by the use of a traction suture. Convalescence was uncomplicated except that there was a slight accumulation in the pericardium because of faulty drainage. Gibbon advises the use of curved intestinal needles, as the bevelled ones cause bleeding; he does not approve of draining the pericardium on the ground that the drainage material acts as an irritant. This observation, however, is not in accordance with the statistical results.

One of the two cases operated upon by Sultan⁶ recovered; in both instances the wound was located in the left ventricle, but in the fatal one the autopsy showed a second wound in the right ventricle partially closed by a thrombus. Death resulted in this case from secondary hemorrhage of the internal mammary artery, and not from any cardiac complication.

A bronchopneumonia was fatal in Niemier's⁷ case, of wound of the right ventricle.

Four fatal cases of wound of the right ventricle are reported by Cannes,⁸ Lenormant,⁹ and Richard and Gaudenet,¹⁰ respectively. Cannes'

¹ Zent. f. Chir., 1906, Nr. 20.

² Arch. klin. Chir., Band lxxix, Heft 4.

³ Deut. Zeit. f. Chir., Band lxxxiii, Heft 3-4.

⁴ Arch. klin. Chir., Band lxxx, Heft 1.

⁵ Jour. Amer. Med. Assoc., February 10, 1906.

⁶ Zent. f. Chir., 1906, Nr. 28.

⁷ Arch. de méd. militaire, March, 1906.

⁸ Bull. et mém. Soc. de chir., July 17, 1906.

⁹ Ibid.

¹⁰ Bull. et mém. Soc. de chir., February 27, 1906.

second case received a wound of both the right ventricle and left auricle, the patient dying suddenly while he was introducing the suture.

Alves¹ had to resort to cardiac massage and succeeded in restoring the heart action. The patient died, however, and the autopsy revealed a deep, penetrating wound of the left ventricle, which severed the mitral pillars.

Quenu's² patient recovered after he sutured a wound in the left ventricle, although the pleura was punctured in several places. Savauriand³ found a complete pneumothorax complicating a wound in the right ventricle which was closed with three sutures, without drainage. Death followed fourteen days later from an infection secondary to a suppurative bronchopneumonia.

Apart from the danger of the preoperative hemorrhage, the risk peculiar to this operation is not so much in the wound or manipulation of the heart as in the injury or infection of the pleuræ and lungs. Many cases of sudden death are due to pleural hemorrhage, while at a later period many patients died from infection of the pleural cavity. The following table includes the 16 cases of suture of the heart which have been published during the past year:

Operator.	Location and size of heart wound.	Results.
103. Travers, Lancet, September 15, 1906.	Right ventricle wounded, closed with 13 sutures. Wound extended into cavity of the heart.	Death on eleventh day, probably from a clot on the anterior surface of the heart.
104. Dalcetti, Zent. f. Chir., 1906, Nr. 20.	1.5 cm. wound of the right ventricle.	Cardiac action resumed when the sutures (3) were inserted. Death on eighth day from peritonitis and mediastinitis
105. Gobell, Arch. klin Chir., Band lxxix, Heft 4.	Bullet wound of left ventricle; point of entrance 2 cm. closed by 4 sutures and wound of exit 2 x 3 cm. by 5 sutures.	Complete recovery, being the fifth recorded case of recovery from bullet wound.
106. Tschernischowski, Deut. Zeit. f. Chir., Band lxxxiii, Heft 3-4.	1.5 cm. wound of left ventricle, closed by means of 3 sutures of silk.	Recovery.
107. Wendell, Arch. klin. Chir., Band lxxx, Nr. 1.	Wound of left ventricle, sutured with catgut, drainage.	Pericarditis, recovery.
108. Gibbon, Jour. Amer. Med. Assoc., February 10, 1906.	Right ventricle, wound 1.5 cm. long, 4 sutures chromicized catgut.	Recovery.

¹ Gaz. Clinica, 1905, Nr. 1.

² Bull. et mém. Soc. de chir., March 20, 1906.

³ Ibid.

Operator.	Location and size of heart wound.	Results.
109. Sultan, Zent. f. Chir., 1906, Nr. 28.	Left ventricle.	Recovery.
110. Ibid.	Left ventricle	Death due to hemorrhage from the internal mammary artery.
111. Niemier, Arch. de méd. militaire, March, 1906.	Right ventricle, improvement after insertion of sutures.	Death from bronchopneumonia.
112. Cannes, Bull. et mém. Soc. de chir., July 17, 1906.	Right ventricle, wound 1 cm., in length, 4 sutures.	Death, pneumonia.
113. Ibid.	Wound 15 mm. of right ventricle and left auricle, one suture.	Sudden death when suture was inserted.
114. Lenormant, Bull. et mém. Soc. de chir., Feburay 17, 1906.	Deep wound right ventricle 15 to 20 mm. in length, 3 silk sutures, heart massage.	Death in five hours, perforations of liver, stomach, and intestines.
115. Alves, Gaz. Clinical 1905, Nr. 1.	Left ventricle.	Death in one hour.
116. Quenu, Bull. et mém. Soc. de chir., March 20, 1906.	Left ventricle wounded in two places	Recovery; pleura was likewise perforated.
117. Savauriand, Ibid.	Right ventricle, 3 sutures, complete pneumothorax	Death in 14 days from bronchopneumonia.
118. Ricard and Gaudenet, Bull. et mém. Soc. de chir., Febauary 27, 1906.	Wound of right ventricle 4 mm. in length, 3 catgut sutures.	Massage to restore heart action, death in twenty-four hours.

CARDIOLYSIS. Inflammation of the pericardium is rarely primary; it develops frequently in the course of infectious diseases, most commonly in acute articular rheumatism, and occasionally as a complication of pleuritis. The inflammatory product may be completely absorbed and leave but slight lesions behind; if it becomes organized dense adhesions form and hinder the cardiac excursion, embarrass the cardiac action, and lead later to insufficiency. For the relief of this symptom Bauer¹ recommended the operation of cardiolysis. Paschkis² found the most common symptoms of these cases to be cardiac insufficiency, systolic retraction of the chest wall, absence of the apex beat, diastolic collapse of the jugular veins, and broadening of the area of cardiac dulness.

¹ PROGRESSIVE MEDICINE, March, 1905.

² Grenz. Med. und Chir., January 18, 1906.

The operation consists in the resection of the third, fourth, and fifth ribs from the sternum to the axilla. Records of but 7 operations have been found; but the results in these were striking: the patients stood the operation well, the pulse became stronger, the cyanosis diminished or disappeared, venous stasis diminished, and they were gradually able to return to work. Continued observations were made for a year and a half after the operation, and up to this time there has been no recurrence. Of the 7 cases, 1 died ten months later from a bronchopneumonia, throughout which the heart's action was strong.

CARDIAC MASSAGE. I have not seen during the past year reference to any recently reported cases of cardiac massage. This may be due, however, to the fact that the operation is no longer a novel procedure and is not regarded as of so sensational a character. I imagine, however, that it is resorted to very much more frequently than would be indicated by the paucity of literature upon the subject. As to the propriety of the operation there is no question that it should be resorted to without hesitation in every case of sudden cardiac failure occurring during the course of the operation, and this, despite the fact that so small a percentage of cases are successful.

Lenormant's¹ summary of the collected cases enables us to draw certain conclusions relative to the efficiency and the desirability of the different procedures. He found that 4 (16 per cent.) of 25 patients were saved. He classifies his cases as positive or negative, according to whether cardiac action was or was not resumed, irrespective of the ultimate result. In 12 of the negative cases normal contractions were noted in 4, but ceased when massage was discontinued; 4 showed fibrillary contraction, and in 4 the result was *nil*. Of the 8 positive cases 4 recovered completely, and in the remaining heart action persisted five to twenty-four hours after the massage was discontinued. In his summary of the successful cases no mention is made of the results of Conkling and Gray.²

Various methods have been suggested as adjuvants to massage, especially electricity and saline infusions; the former is dangerous, but the latter has been favorably reported upon from the experimental laboratories.

The subdiaphragmatic route is conceded to be the most desirable for various reasons, chiefly because it economizes time, enables the heart to be manipulated effectually, and permits of artificial respiration being practised while the operation is going on. In a series of 10 cases it was successful in 6, and in 2 of the remaining 4 there was a transitory return of the cardiac movements. The thoracic route seems to have been the most fatal, Mauclaire Zesas³ reporting 15 failures in 16 cases. The

¹ Revue de chirurgie, March, 1906.

² PROGRESSIVE MEDICINE, March, 1905.

³ Arch. de internal Chir., vol. iii, Fasc. 1.

thoracic or sternocostal operation requires too much time, frequently causes a pneumothorax, and interferes with the practice of artificial respiration. The importance of immediate action is realized when one considers that not one case recovered when massage was delayed more than eight minutes. The chances of success seem to be in direct proportion to the length of time intervening between the arrest of the heart's action and the institution of massage. Recovery should not be despaired of too soon, as in one case the heart did not begin for fifteen minutes after massage had been begun.



INFECTIOUS DISEASES, INCLUDING ACUTE RHEUMATISM AND CROUPOUS PNEUMONIA.

BY ROBERT B. PREBLE, M.D.

DURING the past year there has been a large mass of literature upon the different aspects of the various infectious diseases, although, as has been pointed out before, there is the curious tendency for men in widely separated fields to devote themselves to the same subject. On the whole the result of the year's work is satisfactory, but lacks anything spectacular.

Pneumonia, typhoid, and scarlet fever, the three most important of the infectious diseases to those practising in temperate climates, have been extensively considered; but the most important matter of all, namely, that of treatment, seems as far in the future as ever. So far the advances have been mainly in the direction of being certain that we do no harm.

We have been waiting for some report from Behring upon his new cure for tuberculosis, but so far in vain. This disease, as always, has been the subject of some thousands of articles, most of which are repetitions of things said hundreds of times before.

Insects in the Transmission of Various of the Infectious Diseases. Each year for the past three reference has been made to this matter in PROGRESSIVE MEDICINE because it is in many ways the most important medical demonstration of years. The control of gross, visible parasites like the mosquito and the house-fly is far simpler than a more or less blind struggle against invisible microbes.

There is already a widespread knowledge of the importance of the mosquito in the diffusion of malaria and yellow fever, both among the profession and the layman, but not even the average professional man has due appreciation of the dangerous powers of the common house-fly in the spread of typhoid fever and other infections. Even health authorities are not giving this matter the attention they should. If the Northern health officers were to make as vigorous a campaign against the house-fly, the bed-bug, and the flea as the Southern officers have against the mosquito, people would be freer from these diseases and, in addition, would be more comfortable.

Among the insects which are important is the tick. Thus Ricketts, while unable to confirm the work of Wilson and Chowning upon the

parasite causing the spotted, mountain fever, agrees that the disease is transferred by a tick.

Bearing upon this same question is an article by Robert Koch, who, in a preliminary report upon an expedition to East Africa, makes some important statements which are of more than local interest.

He found there numerous cases of *relapsing fever* and was able to study the relation of a tick to the transfer of this disease.

During the night a patient is bitten by a tick, which thus acquires blood infected with the spirochete. These do not multiply, but in the course of a few days disappear from the stomach of the tick. Careful examination of such ticks will show a certain number of spirochete upon the ovary. It is probable that they here multiply; when the tick has deposited its eggs, some of them will be found to contain the spirochete. Here also they multiply and the young tick from infected localities is capable of exciting the disease.

Koch found no evidences of a cycle of development in the tick.

He also had an opportunity to study the *tsetse fly* and the *trypanosoma*. On examining the flies under the microscope he noticed that the proboscis was always filled with a liquid, which could be expressed in the form of a clear droplet. This always contained the trypanosomes in large number, far more numerous than they ever are in the blood and showing various stages of evolution.

This leads to the conclusion that these flies do not transmit the disease direct by injecting the blood of the sick animal into a healthy one, but that conditions here are similar to those that exist in malaria, *i. e.*, the trypanosomes undergo development in the tsetse fly. When the fly ingests infected blood, the trypanosomes multiply in the stomach by longitudinal division.

It appears therefore a foregone conclusion that in German East Africa the tsetse disease is transmitted by this fly and also by several species of it.

All of this work throws important light upon the question of the prevention of these diseases, and it also furnishes a basis for speculation as to the causation of other diseases. So far the diseases, in regard to which the demonstration is complete, are due to rather highly organized animal parasites. Malaria and the trypanosoma diseases are of this sort. The causal parasite in these diseases undergoes an evolution in the body of the mosquito or tsetse fly. One might infer from this that yellow fever is due to some animal organism which undergoes some developmental changes in the body of the mosquito, but is not transferred to the young of the mosquito. The Texas fever of cattle is due to an animal parasite which is transferred through the bite of a tick and is transferred to the young of the tick. Koch shows that relapsing fever is transferred by a tick and that the young of an infected tick also are able to confer the disease. The mountain fever is conferred by a tick,

and one can reasonably infer that the young of infected ticks can also give the disease.

All of the diseases which so far have been proven to be transferred by the bite of insects are not contagious, leading one to the inference that the contagious diseases are probably not of this nature. This throws doubt upon the work which tends to show that smallpox and scarlet fever are due to some form of animal parasite, and makes it likely that these diseases, like other contagious diseases, are due to some bacteria.

The role of insects in the transfer of bacterial disease—for example, the house-fly in the carrying of typhoid bacilli—is purely mechanical.

If smallpox proves to be due to an animal organism it will be the first disease of this sort which is directly contagious.

Blood Cultures. Another important matter bearing upon the infectious diseases in general is that of blood cultures. No one who has employed this method of diagnosis with any frequency questions its great value. The number of infectious cases, the nature of which is obscure until after blood cultures are made, is very large. This obscurity is particularly marked during the first days of a disease, but may continue for weeks.

So far the employment of this method has been confined almost exclusively to hospitals because of the technical difficulties which surround it in house practice.

In 1905 I drew attention to an attempt made by Rolly to devise some means by which the blood cultures could be made in house practice, realizing that such a method, if satisfactory, would be most valuable.

Since then Müller and Gräff¹ have been trying to devise some method of this sort and have worked along two lines: first, an effort to keep the blood fluid a sufficient time to permit of its transfer to a laboratory, and, second, the use of clotted blood in making cultures. For maintaining the fluidity of the blood they used an extract of leeches which is sold under the trade name of hirudin. This kept the blood fluid and did not kill the bacteria.

Later they used blood clots with satisfaction. For details of their methods, the original article should be consulted.

Diphtheria. ANTITOXIN IN TREATMENT. Articles upon diphtheria are rapidly decreasing in frequency. With so complete a knowledge of the cause, prevention, and cure of this disease, this is as it should be. With an occasional exception in the way of a statistical article, the bulk of the reports during the current year have been upon unusual complications.

Among the statistical reports mention should be made of the work of the New York Board of Health. An account of this is given by J. S. Billings,² who publishes a report of the ten years' experience

¹ Münch. med. Woch., 1906, 69.

² New York Med. Jour., 1905, 82, 1310.

which this Board has had with the use of antitoxin in the treatment of diphtheria. The Department has records of 18,866 cases of diphtheria treated with antitoxin, of which (excluding the moribund cases) 1325 were fatal, a mortality rate of 7.3 per cent. It is no longer necessary to quote figures to prove the specific value of the antitoxin, but it may be worth while to point out that increasing experience gives still greater confidence in this remedy, and the reports now extend over so long a period, cover so many cases, and come from so many localities that no one can any longer refer the uniformly good results to mildness.

Almost the same mortality is shown in a report of the work in Marfan's clinics as given by Le Play. He reports 561 cases of diphtheria treated during one year. The mortality was 7.66 per cent., or, if one deducts 13 cases dying within twenty-four hours after entrance, a percentage of 5.47.

Among the cases were 7 cases of coryza, 5 of conjunctivitis, 6 of diphtheria of the lips, and 2 of diphtheria of the anogenital region.

The following table of complications is of importance:

	Cases.	Deaths.	Per cent. mortality.
Bronchopneumonia	40	14	35
Pleural effusion	3	2	66.6
Pulmonary congestion	8	1	12.5
Pulmonary edema	3	3	100
Phlegmon of neck	2	0	0
Otitis media suppurativa	13	0	0
Diphtheritic paralysis	12	6	50

Antitoxin injections were given to 749 patients; 69 showed a subsequent urticaria; 13 showed erythema. Intubation was made two hundred and nine times, and tracheotomy only ten times. Usually one intubation was sufficient, but in some cases it was repeated six, seven, eight, and in one case even fourteen times. The tubes were rarely needed for more than four days.

When one recalls the mortality from this disease in the preantitoxin era, one must be rejoiced by such a low death rate, and one would be satisfied with it were it not for the fact that there are still too many children dying from this disease.

As long as there are men who defer the use of antitoxin until the third, fourth, or fifth day of the disease, we must complain of the results. It has been repeatedly shown that the mortality of diphtheria is less than 1 per cent. if the antitoxin is used in sufficient doses during the first twenty-four hours. There are no doubt many difficulties in the way of giving every case of diphtheria the antitoxin during the first day. The doctor does not often see the case so early, and if the membrane begins its formation in the nares or high in the pharynx, the possibility of a diphtheria may not occur to one. Even when we make allowances for these possibilities, the use of the antitoxin is too often delayed. The

rule should be, whenever the suspicion of diphtheria is reasonably possible, the antitoxin should be given at once. Do not wait for a report on the culture. Use the antitoxin at once and freely; in this way, not only will the mortality be reduced, but the complications will be less severe and less frequent.

Le Play's article points out anew the importance of a complication which is frequently overlooked and, even when it is recognized, its importance is not appreciated. This is *bronchopneumonia*.

It increased the mortality to 35 per cent. This complication is common, and, while the early use of antitoxin will not entirely prevent its occurrence, it will lessen the frequency. The chances of a child developing a bronchopneumonia are much greater if the larynx is involved, and are still further increased if intubation or tracheotomy become necessary, which they rarely do if the case is properly treated.

CULTURAL DIAGNOSIS OF DIPHTHERIA. Another statistical article during the year worth quoting because of the bearing which it has upon the question of the diagnosis of the disease is that by Scheller,¹ who publishes the experience of the Hygienic Institute of the Royal University at Königsberg covering 7500 cultures for the diagnosis of diphtheria, the results of which, while not new, are important as confirming previous experience. Cover-glass preparations made directly from the throat are not to be recommended, not only because they usually fail, but also because, even when the bacilli are present in large number, errors are easily made.

Cultures kept from ten to twelve hours in the oven give the best results, and the new Neisser double stain is particularly recommended. The bacilli can usually be found for three weeks after clearing of the throat, but may be found much longer.

Prophylactic doses of antitoxin protect only for a short period, so that the persons with bacilli in the throat or nose should be kept isolated until everything is clear.

While it is true that the immunity conferred by the antitoxin is of short duration, it is usually long enough to carry the child beyond the period of danger of direct infection by the member of the family who has been sick.

In view of the fact, well based on general experience, that *nursing babes* rarely have diphtheria, the report of a case of laryngeal diphtheria in a nursing baby of three months and twenty-six days is interesting. Such a case is reported by Beals,² of Buffalo.

This recalls to me a personal experience of some years ago. Because of the current idea that nurslings show an immunity to diphtheria, I omitted giving an immunizing injection of antitoxin to the baby of a

¹ Deutsch. med. Woch., 1906, 321.

² Buffalo Medical Journal, 1905 and 1906, 361.

large family in which diphtheria had appeared. All the other children were immunized and none acquired the disease. The baby, however, did. Since then, I have not failed to immunize the nursing babies and have never had reason to regret it, even though in one instance the baby was less than one week old. I am inclined to the opinion that the apparent immunity of the nursing baby is purely apparent and not real. It is the result of lessened chances for infection, rather than of increased resistance.

THE HEART IN DIPHTHERIA. Bolton¹ has an interesting article upon the treatment of heart failure in diphtheria. This most serious complication of diphtheria has been repeatedly considered in earlier articles, but one sees so much carelessness in the treatment of this disease that it may be well to join with Bolton in insisting upon the necessity of absolute rest for the children. All too often one sees the patients up and running about even during the active stage of the disease. This is even more common now than in the preantitoxin days, because of the freedom from subjective symptoms which many cases show. This is absolutely wrong, and even mild cases should be kept at rest in bed for a couple of weeks, even when no irregularity in the heart's action or undue rapidity of the beat is present.

The time of confinement must be prolonged if either of these things appear; how long must be determined for each case. Bolton very properly points out the impropriety of giving digitalis to the cases showing a postinfective bradycardia, and inclines to the opinion that belladonna is useful because it paralyzes the termination of the vagus, thus accelerating the heart's action and increasing the systole.

How much the vagus has to do with this *postinfective bradycardia* appears to me to be questionable. I am personally inclined to believe that the slow pulse is the result of an acute myocarditis. These cases usually recover; so that the opportunities for determining the exact pathological conditions present are not numerous.

The question of postinfective bradycardia has not received the attention which it deserves.

It is very common after certain of the infectious diseases, notably diphtheria, pneumonia, and typhoid, and yet the literature on the subject is very limited.

COMPLICATIONS OF DIPHTHERIA. Among the complications of diphtheria which have been considered during the year is that of *hemiplegia*. We are so accustomed to thinking of the postdiphtheritic paralyzes as due to neuritis and showing the usual symmetrical and peripheral distribution of the neuritides, that we often forget the possibility of paralysis of central origin and hemiplegic or monoplegic distribution. For this reason we quote an article by Rolleston,² who adds one more to

¹ Lancet, 1906, 1, 282.

² Medical Press and Circular, 1905, 131-641.

the short list of cases of hemiplegia following diphtheria. The patient, a boy of six years, entered the hospital upon the sixth day of a severe diphtheria. He then received the antitoxin for the first time, getting in all 24,000 units in two days. The heart at entrance was normal, but later became very irregular, with evidences of failing compensation and without any evidences of endocarditis. On the twenty-third day of the disease he developed a right-sided central hemiplegia with aphasia. Fifteen days later he showed signs of paralysis of the muscles of deglutition. He gradually improved and left the hospital after a stay of one hundred and twenty-three days, showing still some traces of the hemiplegia.

In 1898 Slawyk collected 50 cases of hemiplegia following diphtheria and Rolleston has been able to collect from the literature 14 more, thus bringing the number of cases to 65. No case is recorded in which the hemiplegia appeared during the first week; 9 occurred in the second; 20 in the third; 11 in from the fourth to sixth weeks. In the other cases the time is not stated.

Autopsies were held in 15 cases. Hemorrhage was found in 1, thrombosis in 2, embolism in 10, embolism and thrombosis in 1, and sclerotic atrophy of one hemisphere in 1. Complete recovery is rare; contractions and atrophy of the affected limbs have usually occurred; hemichorea, athetosis, and idiocy are mentioned as sequels; sensibility in most cases is intact.

Babinski has clearly shown that hemiplegia differs from all the other palsies of diphtheria in being primarily a vascular lesion. Thrombosis, embolism, or hemorrhagic encephalitis may be the pathological state causing the condition, and while, as Slawyk points out, the clinical differentiation of these various pathological processes is impossible, embolism is the most probable.

Emboli elsewhere than in the brain have been reported, in kidney, spleen, pulmonary, and femoral arteries, and recently by Marfan in the abdominal aorta.

These cases may be compared to those of hemiplegia or infarcts of other vessels seen in the course of other infectious diseases, such as typhoid. The emboli are derived from intracardial thrombi, formed probably as the result of the cardiac weakness.

These cases must be carefully distinguished from those instances of infectious diseases in which endocarditis develops as a complication. In such cases the source of the embolism is the exudate upon the heart valves.

Among the autopsy records are two of thrombosis and one of hemorrhage. The explanation of such complications as these does not readily occur to one, for neither thing is liable to happen in the brain of a child. It is possible that the cases reported as thrombosis were primarily cases of embolism to which thrombosis was added, and the hemorrhage might have been the result of an infected embolus overlooked at the autopsy.

Infections of the serous membranes rarely develop in the course of diphtheria, a fact which is important and particularly interesting when contrasted with the frequency with which such complications occur in certain other diseases accompanied by a pharyngitis, notably scarlet fever. The opportunities for a secondary infection with pus or pneumococci are so numerous in diphtheria that it is strange that arthritis, pericarditis and endocarditis, and pleurisy are so uncommon.

That such complications are, however, not unknown is shown by an article in which Degny and Detot¹ discuss at length a rare complication of diphtheria, namely, *pleurisy*. The frequency with which this is found varies somewhat: from Marfan's clinic comes a report of 5 examples in 1122 cases of diphtheria; Leenhardt saw it 4 times in 1142 cases. Autopsy reports make it more common: 13 times in 85 cases in the service of Marfan.

The pleurisy may take any form, but the serofibrinous exudate is much the commonest. It is associated either with a bronchopneumonia or purulent bronchitis as a rule, but occasionally cases in which the lungs are free are recorded.

The symptoms present no peculiarities and appear, on an average, from ten to twenty days after the onset of the angina. As is generally true in children, the pleurisy may be quite latent, being found only by careful and repeated physical examinations.

The bacteria exciting the pleural inflammation, usually a streptococcus, staphylococcus, or the pneumococcus, reach the pleura, usually through the air passages, after exciting a bronchopneumonia, but may get there through the blood or through the tissues of the mediastinum.

In addition to this one may say that the mortality in these cases is high, being one of the serious complications of diphtheria, not, I believe, so much because of the pleurisy as because of the condition of which the pleurisy is usually an expression, namely, a general sepsis.

Another article which has interested me greatly is one upon the *treatment of postdiphtheritic paralyses by antitoxin*. This has been employed at intervals for some years, but if the experiences reported by Comby are confirmed by others, this very serious result of diphtheria is robbed of its terror. The results, however, are almost too good to be true, and, furthermore, do violence to commonly accepted ideas as to the manner of recovery of these cases.

The paralysis is due to a neuritis, and here, as in other forms of neuritis, it is supposed that recovery takes place by the gradual outgrowth of the nerve from the cell in which it originates. This takes place slowly, and recoveries from neuritis in a few days or a week are so out of accord

¹ Revue mensuelle des maladies de l'enfance, 1906, 49.

with average experience that one must reserve his decision for further data. In these days of rapid communication, it ought not to take long to settle the question.

The antitoxin would certainly be harmless, and recovery in these cases is usually so slow that many will be led to try the plan.

Comby¹ reports 3 additional cases of postdiphtheritic paralysis treated by antitoxin injections with rapid recovery. Last year Mour-niac collected 18 cases favorably influenced by the antitoxin. The most striking thing about the cases reported by Comby is the startling promptness with which the cases recovered: "in eight days the paralysis was cured;" "complete recovery in one week;" "the child could walk with help on the fifth day."

Hopmann presented before the Laryngological and Otological Society of West Germany a boy, aged nine years, who had a complete *occlusion of both nares* following a severe and prolonged diphtheria of the nose three years previously. This result of diphtheria is, fortunately, very rare. Raoul was able to collect but 12 instances from the literature.

Martin² again points out, and illustrates with two additional cases, the fact that diphtheria may present itself under the clinical picture of the *peritonsillar abscess*. The tonsils may or may not show a false membrane, a fact which does not at all aid in the diagnosis, for the peritonsillar abscesses of streptococcus or staphylococcus origin may also show false membranes resembling in all ways those due to the Klebs-Loeffler bacillus. The diagnosis in these cases can be made only by means of the culture. It is important that the diagnosis should be made, for, unless these cases receive liberal doses of the antitoxin, the mortality is high.

DIPHTHERIA AND MEASLES. The coincident or closely subsequent existence of two of the acute infectious diseases is always a matter of importance. Any variety of combinations may exist, but one of the important ones is the combination of measles and diphtheria.

Hellström,³ of Stockholm, reports 229 cases of this combination: 112 of measles followed by diphtheria and 117 examples of the opposite sequence. Only cases in which the Klebs-Loeffler bacillus was demonstrated are included.

Of the 112 cases in which the diphtheria followed the measles, no less than 98, *i. e.*, 87.5 per cent., had a laryngitis. This at once shows how dangerous this sequence of infections is. The same thing has been noted in other series of the same sort; thus, of Linsbauer's 68 cases, 73.5 per cent. were laryngeal, as were 52 per cent. of Blakely and Burrows' 157 cases in the Boston Hospital.

This sequence of infections is particularly common during the first six

¹ Bull. et mém. Soc. médicale de Paris, 1906, 626.

² Le bulletin médicale, 1905, 19, 1100.

³ Wiener medizinische Blätter, 1906, 279.

years of life, 81.25 per cent. of the 112 cases being of this age. There were 62 deaths in the series, all except 1 of them being cases of croup, and 39 of the deaths were of children under three years of age.

A comparison of the cases of croup after measles shows that they are far more serious than cases of croup only. Thus the mortality in the same hospital in 1962 cases of croup was 27.3 per cent., as compared with 62.24 per cent. in this series.

Of the croup cases, 60 per cent. required operative help, while 68 per cent. of the measles-croup cases died. Of the former, 58.7 per cent. recovered and of the latter only 25.3 per cent.

Before the use of the antitoxin 40 cases of measles-croup showed a mortality of 72.5 per cent. Since the use of antitoxin the mortality has fallen to 55.1 per cent.

In speaking of the use of the *antitoxin as an immunizing agent against diphtheria* in cases of measles, he does not regard it as necessary unless the diphtheria bacilli are demonstrated.

I think that most men doing hospital work would disagree with this. The antitoxin is so free from injurious effects, and in doses sufficient for immunizing purposes so cheap, that I am convinced that all cases of scarlet fever and measles treated in a hospital which receives diphtheria cases, should, as a routine measure, be given an immunizing dose. In private practice, where the opportunities of infection are not so great, this is unnecessary.

The cases in which measles develops after diphtheria are of quite a different sort. Thus, of the 117 cases only 8 died, and all of these were under six years of age, and 3 of these were instances of the severest type of diphtheria.

Dysentery. ANTITOXIN TREATMENT. It is now certain that we must alter our old conception of the distribution of this disease. It can no longer be regarded as a disease of the tropics. It is universal in its distribution, occurring everywhere and at all seasons of the year. As pointed out in an earlier article in *PROGRESSIVE MEDICINE*, a very large proportion of the intestinal infections of young children are due to some one of the types of dysentery bacillus. This is true also of many cases which do not present the clinical picture usually associated with the word dysentery.

Not only has the bacillary nature of the majority of the cases of dysentery been proved by the work of the last few years, but out of this same work has come the antidysenteric serum. From many sources there come most encouraging reports of the use of this therapeutic agent; and while the results do not appeal to one as strongly as do the results of the antidiphtheritic serum, this is probably because for us dysentery has not been the serious and common disease which diphtheria has.

Only a few articles are quoted this year, all bearing upon the frequency

with which bacillary dysentery occurs, and with the favorable results obtained from the serum.

One is particularly impressed by the method of preparation of the serum employed by Vaillard and Dopter. Their antidysenteric serum was prepared by the alternate injection of the living bacilli and their toxins into horses. At first the injections were made subcutaneously, but later intravenously. Such a serum, they claim, is both antitoxic and antimicrobial. When one recalls the intensely severe constitutional symptoms often seen in dysentery, and only in part explained by the diarrhea and loss of blood, the importance of some means of combating the toxic elements of the disease is apparent. In fact, it may be that the toxic elements are more important than the infectious.

Vaillard and Dopter,¹ after reviewing the bacteriology and serum development of bacillary dysentery, report their experiences with the use of antidysenteric serum in the human. In all 96 adults were treated by means of the serum only. The cases varied greatly in severity, which was estimated by the number of bowel movements, pain, and evidences of intoxication rather than by the degree of elevation of temperature. Cases with 15 to 30 stools per day were classified as moderately severe, 30 to 80 stools as severe, 80 to 150 as grave, and over 150 as very grave.

The dose of serum was from 20 to 100 c.c. The action was prompt and the pain lessened or disappeared within twenty-four hours except in the worst cases; the stools lessened in frequency and ceased to be bloody.

The article is illustrated by a number of charts showing the astonishing fall in the number of stools after the injection. The worst one given entered on the fourth day with over 140 stools per day; 25 c.c. of serum was given and the next day the stools were less than 50; 15 c.c. of serum was given and the next day the stools were only 5.

They conclude that the serum of horses immunized against the dysentery bacillus has both antimicrobial and antitoxic properties.

This serum is harmless to the human even in large and repeated doses, is a specific means of treating bacillary dysentery, and is without effect upon other forms of dysentery. The size of the dose varies with the severity of the infection and intoxication. The effects are the prompter and more striking the earlier the serum is given. It is, however, valuable even when given as late as the sixteenth day.

In regions where both the amebic and bacillary forms of this disease are equally common, the effect of the serum would be a means of diagnosis, the amebic dysentery being influenced in no way by the serum.

Lüdke² reports his experience with an epidemic of dysentery in

¹ *Annales de l'Institut Pasteur*, 1906, 20, 321.

² *Deutsch. med. Woch.*, 1906, 32, 181.

Barmen. The article contains a rather careful review of this disease, but reference will be made merely to certain points. His cases were treated with Kruse antidysenteric serum, and the results obtained were appreciably better than those yielded by the ordinary medical treatment. The number of bowel movements rapidly decreased, the general condition improved, the appetite returned, and blood and mucus promptly disappeared from the stool. The diagnosis was in each case made by cultures from the stools.

The agglutinating power of the serum over the organism causing disease is of more value later than during the active stage of the disease. It enables one to recognize cases which have recently recovered from dysentery, but usually during the active period the symptoms are too characteristic to need the serum reaction for the diagnosis.

BACTERIAL STUDY OF DYSENTERY. Aucho and Campana have been making a study of the bacterial contents of the mucous or bloody stools of children with dysentery in France, and find that while many of the cases are due to the Shiga type of the dysentery bacillus, others, fewer in number, are caused by the Flexner organism. They found that the serum of patients with the Shiga type of infection agglutinated the Shiga bacillus in high dilution and not at all the Flexner organism, while the serum of patients with Flexner infection behaved in an inverse manner.

Epidemic Meningitis. **CONTAGIOUSNESS OF MENINGITIS.** During the year this disease has continued to be the subject of much work and discussion, though fortunately the number of cases has shown a material decrease. One aspect of the disease, namely, its contagiousness, has been carefully considered, especially by the New York Board of Health. So far this disease, while characterized by the term "epidemic" and well deserving this term, has furnished few proofs of being contagious, and the facts added by the New York Commission do not greatly strengthen the claim made by many that the disease is contagious.

Boldvan and Goodwin¹ published, in December of last year, the first part of the report of a Special Commission of the New York Department of Health to study epidemic meningitis. The report includes much interesting information on the history of this disease collected from the literature, and closes with a report of the original work done.

The clinical data upon which the study was based were limited to cases occurring two or more in one house during the period from January 1, 1905, to June 1, 1905.

The bacteriological study, on the other hand, while including some of the same cases, embraces a much more extensive series and includes also persons apparently well.

During the six months there were 1500 reported cases, 88 of

¹ Medical News, 1905, 87, 1222, and 1250.

which were multiple, but for lack of time only 58 of these were studied. These 58 instances included 144 cases, distributed as follows: 39 instances with 2 cases to a house; 15 with 3; 2 with 4; 1 with 5; 1 with 8.

The interval between the death or removal of the first case and the onset of the subsequent case or cases varied from one day to three months. The *incubation period of epidemic meningitis* is usually placed at four days; 34 cases are included in this group, only 9 of them appearing within four days after removal of the first case.

There were 18 instances in which the second case developed before removal of the first.

Case 7 is of interest as throwing some light on the period of incubation. In this case two children developed the disease within two days of each other, and the only contact between them had occurred a day previous to the onset in one of them. If both were infected from a common source the incubation period for one was one day and for the other two days. If the second child was infected from the first, the incubation period was three days. The latter agrees more closely with the cases in literature.

These facts, while suggesting the possibility of contagion, are far short of proof and remind one of the proofs given of the contagiousness of pneumonia.

Certainly if the disease is contagious it is far less so than such diseases as scarlet fever, measles, and diphtheria. One could easily accumulate much stronger evidence of the same sort to prove that typhoid fever is contagious, and opinion is everywhere in accord that this latter disease is not contagious, contact with typhoid cases only multiplying to a small degree the chances for direct transfer of the typhoid bacilli.

In the *New York Medical Journal*, 1906, 83, 273, Hare reports a particularly sad instance of what would seem to be an illustration of the contagiousness of meningitis. Upon a Thursday Dr. A. B. Craig, of Philadelphia, saw a patient suffering from a meningitis which ended fatally forty-four hours after its onset.

Upon the following Monday Dr. Craig became ill and died nineteen hours later and only eight hours after the appearance of distinct meningeal symptoms.

It is fortunate that such instances as these are so exceptional, but, rare as they are, they make one pause and think.

STATISTICAL STUDIES ON EPIDEMIC MENINGITIS. Among the statistical articles of the year is one by J. S. Billings,¹ who publishes a report of the 1904 and 1905 epidemic of cerebrospinal meningitis, from which a few points are selected. The cases were about evenly distributed as to sex, 55 per cent. male and 45 per cent. female. Age

¹ Jour. Amer. Med. Assoc., 1906, 1, 1670.

is obviously a predisposing factor, for no less than 67 per cent. of the cases were under 10 years of age.

In only 6 per cent. had there been any direct exposure to other cases, and in only a small number was there evidence of direct transmission of the disease. There were less than 100 instances of possible transmission out of over 1500 cases, and in all but a few direct transmission was possible, not probable.

In all but 5 per cent. of the cases the onset was sudden. Stiffness of the neck was the commonest symptom, being present in 85 per cent. of the cases. Closely following it came vomiting, headache, and convulsions. An eruption was present in 30 per cent. of the cases, being petechial in 19 and herpetic in 11 per cent.; nasal discharge was noted in only 13 per cent. If the disease were always transmitted by the discharges, it would seem that nasal discharge should be more common. Kernig's sign was absent in but 15 per cent. of the cases. Fever and leukocytosis were practically always present.

In 33 per cent. of the cases *lumbar puncture* was performed and in 82 per cent. the meningococci were found.

Diphtheria antitoxin was used in 313 cases, of which 223 were fatal, a mortality of 71 per cent. Careful study of the individual cases failed to show any grounds for believing that the antitoxin had any beneficial effect whatever.

Billings concludes that clinical investigation so far has thrown very little light on the mode of transmission, nor has any effectual method of treatment been discovered. He then states—although his reasons for doing so are not clear—that the disease is probably much more infectious during the first two weeks of its course.

Guided by this the New York Health Department enforced quarantine for the first two weeks. In view of the fact that we know practically nothing of the way the disease is transmitted, this is perhaps wise; at any rate, it is making the error on the safe side.

One table given by Billings is of interest because of its bearing upon the diagnosis of meningitis. There were 357 cases in which the diagnosis of epidemic meningitis was originally made and which ultimately proved to be something else. Among these were 106 cases of tuberculous meningitis, 50 of simple meningitis (whatever that is), 48 cases of gastroenteritis, 29 cases of pneumonia. There were also many other diagnoses ranging from tonsillitis to cellulitis of the foot.

The third Heft of the *Klin. Jahr. f.* 1906 is devoted entirely to a very thorough consideration of epidemic meningitis by Göppert, Altmann, and Meyer. The first point considered is whether or not children of certain dispositions are prone to this infection. It has been shown by others that the rachitic children are not, and Göppert was unable to show that the children with enlarged lymph glands were more prone to this infection. In only 1 of 52 sections did he find adenoids,

large enough to suggest the advisability of removal. The thymus gland also was not found larger in the fatal cases than in others.

After describing the changes found in the sections of the respiratory tract, Göppert concludes that the infection atrium may be now in one place and now in another, and that further, the meningococcus may reach the meninges through the blood stream.

It is quite useless ordinarily to attempt to determine where the pus in the meninges is oldest, but this much can be said, that in Göppert's cases the chiasm was not the commonest site. In most of his cases the disease was most fully developed on the convexity of the brain, along the anterior and middle cerebral artery, a fact which suggests some other infection atrium than the accessory sinuses of the nose.

Numerous interesting points concerning the various symptoms are brought out.

Consciousness is usually retained throughout the major portion of the course, except during the first day, when the patients are frequently unconscious, a fact which, as Heubner points out, is of considerable value in the differential diagnosis.

The temperature curve consists of a series of exacerbations and remissions and each rise of temperature is accompanied by vomiting, headache, and anorexia.

The pulse during the earlier periods is slowed, but later becomes rapid and often irregular.

The respiration, during the first days of the disease may be very rapid, in a case noted reaching 72, and this without there being any demonstrable changes in the lungs.

Clonic convulsions often begin the clinical picture in the cases which die soon.

Vomiting is an initial symptom in about three-fourths to four-fifths of the cases, but is often wanting in cases under three years, while older children usually vomit.

One of the most important symptoms is excessive irritability to passive movements.

Paralysis, as an early symptom, varies greatly in different epidemics, in some being very unusual, while in others it is present in the great majority of cases.

The condition of the pupils varies, but the majority of cases is normal throughout. In some cases the pupils do not react, even during the first week; in others asymmetry of the pupils is found; more often than either of these, there is an exaggeration of the reaction of the pupils to pain.

Herpes between the second and sixth days is very common, and may occur in as high a percentage as 66.

Rigidity of the neck is a very important symptom. During the first few days of the disease it may not appear. This is especially true in children under three years.

Kernig's sign is about equally constant.

Göppert concludes that there is no method of treatment which particularly influences the mortality of this disease. In speaking of the warm baths recommended by Aufrecht, he says that they are sometimes useful in allaying pain, but that some patients are too greatly disturbed by them; in such cases a cool pack may prove beneficial.

The lumbar puncture is a very useful diagnostic aid, and may be of some value in relieving pressure symptoms.

Altmann concludes his observations upon the prognosis by saying that the prognosis as to life is very bad; as to health, one-fourth are deaf and a small portion are feeble-minded, but that the greater part of those who recover do so completely.

Leszynsky¹ publishes a report based upon 30 cases of epidemic meningitis seen during the last epidemic in the Lebanon Hospital of New York. In all but one, the diagnosis was confirmed by the demonstration of the meningococcus. The patients were 17 males and 13 females, ranging in age from sixteen months to twenty-seven years and averaging eleven years. Fifteen of the cases died after an illness ranging from five to forty-five days.

A number of special symptoms are particularly discussed. Among them is the herpes. This eruption was present in 10 cases; either over a branch of the fifth nerve or some one of the cervical nerves. Its presence has no influence on the prognosis. Petechiæ were present in 7 cases.

Muscular rigidity of the neck was found twenty-eight times. General rigidity with opisthotonos was seen in 4 cases, and marked rigidity of the legs with flaccidity of the arms was seen in 5.

Loss of control of the bladder and rectum occurred only in association with delirium or stupor, and was evidently the result of the disturbance of the sensorium rather than of the spinal meningitis.

The knee-jerks were absent in 14 cases. Kernig's sign was present in 27. The Babinski plantar reflex was present in 10 cases. Facial paralysis occurred in 4 of the fatal cases.

Deafness developed in 5 cases, 2 of which ended fatally. Eye symptoms developed in 12 fatal cases and in 4 who recovered.

The prognosis is perplexing, for apparently mild cases may die and those presenting an alarming picture may recover. In infants and young children the mortality is high.

The treatment employed by Leszynsky was the usual symptomatic one with this exception, that ergot was given hypodermically in doses ranging from 10 to 30 minims, with "most gratifying results."

Lumbar puncture was performed once or several times in every case. As a measure for the temporary relief of excessive intracranial pressure,

¹ Medical Record, 1906, 69, 325.

its therapeutic value must be conceded. In 2 patients intraspinal injections of lysol solution were made, in 1 a 1 per cent. solution was used, and in the other a 10 per cent. These patients recovered, but it was also used in several of the fatal cases without benefit.

During the year nothing has been added to our means of treatment, and nothing so far done has seemed to much influence the mortality. I have personally had one recovery under the use of intraspinal injections of *lysol* solution and shall continue to try this method, although I am not particularly hopeful of the results. It merely appeals to me as being more promising than the other things suggested. If all would unite in trying it for a year the question could be definitely and promptly settled.

The diagnosis of meningitis of any type is often surrounded by great difficulties. This is due to the fact that the clinical picture consists of two parts: (A) the general symptoms of an infection, and (B) the special symptoms which result directly from the meningitis. This latter group of symptoms may be subdivided into two others: (1) the generalized meningeal symptoms, such as rigidity of the neck, the Kernig sign, the photophobia, the sensitiveness to sound, the headache, the vomiting, even the choked disk, and (2) the focal symptoms, such as the paralysis of the various cranial nerves.

If the symptoms are entirely those of group A, as they usually are at first, and may be throughout the entire course of the disease, the possibility of there being a meningitis present would suggest itself only in the presence of an epidemic, and a diagnosis is impossible, except by means of the lumbar puncture. It is only when symptoms of group B are present that a diagnosis of meningitis readily occurs to one, and even then the diagnosis cannot be made with certainty except by the lumbar puncture unless symptoms of subgroup 2 are present. It is only when one recalls this grouping of symptoms that one can realize the possibility of such errors as some listed in Billings' table.

There has been some discussion of the *blood findings* in this disease. Heretofore there has been little success attending the attempts to cultivate the meningococcus from the blood of patients suffering from this disease, and yet there are good reasons for thinking this disease probably a septicemia with marked localization in the cerebrospinal axis, as pneumonia is a septicemia with pulmonary localization, or typhoid one with intestinal localization. Two articles are quoted, one by Robinson, with whose inferences one finds no reason to agree, and one by Elser. The latter article covers much more work and I am in accord with his opinion, that later work will show a still higher percentage of cases in which the meningococcus is found in the blood.

I would, however, warn against his conclusion that the blood cultures may prove of prognostic significance, the mortality being higher among cases which are proved clinically to be septicemia. This same inference

was drawn a few years ago in regard to pneumonia and typhoid fever, and in both instances later work showed that such prognostic inferences were not well founded.

Robinson¹ reports finding the *meningococcus* in the *spinal fluid* of 14 of 15 cases of epidemic meningitis. He obtained the organism in the blood of 2 out of 4 cases examined. He states that the organism is probably only an occasional invader of the circulating blood. So far as his own observations go, he might equally well have concluded the opposite. At present there is not enough data upon this point to settle it, but personally I am strongly of the opinion that eventually the meningococcus will be found as frequently in the blood as its close relative, the pneumococcus.

Elser² reports a *bacteriological study* of 130 cases of epidemic meningitis observed in New York during 1903, 1904, and 1905. In 109 cases the diplococcus intracellularis was obtained in culture or in smears from the spinal fluid. Blood cultures were made in 41 cases and positive results were obtained in 10. Elser points out that the character of the culture media appears to have a marked influence upon the success of the blood cultures, positive results being relatively frequent with some specimens of media, while others were quite useless. The blood cultures did not prove to be of any diagnostic value, but Elser is inclined to think that they may have some prognostic significance, for 80 per cent. of the cases in which the meningococcus was obtained from the blood died. He, however, points out that the technique is still faulty and that later work will probably alter any opinion based upon so few cases.

Cultures were taken during life from 22 cases, and the meningococcus obtained in 6 of them. In these examinations only such Gram-negative cocci were accepted as corresponded in every particular with meningococcus strains isolated from the brain and spinal fluid of genuine cases. Other Gram-negative cocci were provisionally designated as the micrococcus catarrhalis.

The autopsy reports bring out one important new fact. The characteristic hyperplasia of the thymus and lymphoid structure of the body constituting status lymphaticus was present in 6 cases of fulminant meningitis. All of these cases were under twenty-five years of age and in no case did the disease last more than seventy-two hours.

Status lymphaticus was present in over one-fourth of the cases examined postmortem, and it must therefore be regarded as an important predisposing factor.

This is another instance of the general rule that that mysterious condition known as the status lymphaticus is a very serious thing in infectious diseases, just as in all other things. It is certain that this condition

¹ Amer. Jour. Med. Sci., 1906, 131, 603.

² Journal of Medical Research, 1905, 14, 89.

will be found with surprising frequency in the autopsies of the fulminating instances of all infections. Whether or not it would be found in 25 per cent. of children dead of other infections, as was found by Elser to be true of the meningitis, cannot be stated.

It is greatly to be regretted that this condition cannot be recognized during life, and that nothing is known which influences it, when its presence is suspected.

In an article by Göppert, to which reference has been made, it is stated that the lymph glands, adenoids, and thymus gland were not found to be larger in these cases than in others.

In an earlier article in *PROGRESSIVE MEDICINE* reference has been made to a number of workers who have been studying the *nasal and pharyngeal secretion of cases of meningitis*, and of those coming in contact with such cases. It is now clear that in many of these earlier attempts there was not sufficient care taken to distinguish between the meningococcus and the micrococcus catarrhalis. During the year there have been some articles in which particular attention has been paid to this point. Articles by Goodwin and von Sholly and by Davis are quoted.

Goodwin and von Sholly¹ report some careful work upon the presence of the *meningococcus in the nasal secretions* of patients ill with epidemic meningitis and of those in close relation to such patients. This work is the more important because, while there are a considerable number of reports of this sort, the number of cases in which the presence of the meningococcus has been definitely demonstrated is very small. The difficulties in the way of identifying this organism and distinguishing it from other Gram-negative micrococci of the nose are so great and were formerly so little appreciated that much of the earlier work along this line is valueless.

Goodwin and von Sholly examined 52 cases of meningitis and demonstrated the cocci in something over 50 per cent. of them. The percentage of successful examinations was higher in the cases examined early in the disease.

The nasal secretions of 45 healthy persons living in close contact with meningitis patients were examined and the specific coccus found in about 10 per cent.

This work would tend to strengthen the suggestion formerly made to isolate cases of epidemic meningitis.

Davis,² in the course of a study of the meningococcus, reports some things which are of interest. He points out anew the impossibility of distinguishing by smears or by simple cultural methods between the micrococcus catarrhalis, so often found in the nose and throat, and the meningococcus. Most of the reports so far made, claiming to demon-

¹ Journal of Infectious Diseases, 1906, Supplement 2.

² Ibid., 1905, 602.

strate the presence of the meningococcus in the nasal secretion of patients suffering from epidemic cerebrospinal fever are of this sort, and yet it is probable that later work derived from careful cultural and agglutination tests will confirm this notion founded now on absolutely unreliable data.

One of the more important points from the standpoint of clinical medicine is the agglutination of the meningococcus by the serum of patients suffering from this infection. One of the cases reported by Davis had been ill for over three weeks, the disease running a mild and chronic course. Cultures made from the cerebrospinal fluid were at first negative and finally successful only because of most careful technique. In this case the agglutination reaction was obtained in 1 to 100 in thirty minutes. In suspicious cases this agglutination test should be tried.

Davis points out also that the meningococci are killed by normal or meningitic sera in from one to two hours, and shows that the meningococci are no more affected by antidiphtheritic serum than they are by the normal serum of the horse. This is simply the laboratory confirmation of the practical conclusion that the employment of the diphtheria antitoxin in the course of epidemic meningitis, as advocated by Wolff, is useless. In this connection see also the article by Billings previously referred to.

Malaria has been the subject of a rapidly decreasing amount of discussion, most of the articles which have appeared during the year being merely reiterations of well-established facts.

HEMOGLOBINURIA. Some articles upon the *black-water fever* have been published which are of interest. This complication of malaria has been the subject of an immense amount of discussion, and there still prevails great difference of opinion as to its nature, cause, and treatment.

Many of the infectious diseases are associated with hemolysis. In some this is very rapid and out of proportion to the other manifestations. For example, acute articular rheumatism causes, even in mild cases, a very considerable degree of anemia in a short time, while typhoid, usually a more severe and prolonged infection, does so to a much less degree. We must assume that there is something about the different infecting agents which affect to different degrees the blood cells.

I have recently seen an example of very rapid and extreme hemolysis in a woman suffering from a streptococcus infection. Within less than twenty-four hours after the onset of the first symptoms the number of red blood corpuscles had fallen to 2,500,000, and while the number of blood cells previous to the illness is not known, we may, with reason, assume that they were not much below the normal, because the young woman had been for a long time in good health and doing hard work. Within thirty-six hours hemoglobinemia and hemoglobinuria appeared and death occurred within forty-eight hours after the initial symptoms. Streptococci were found in the blood during life; the infection atrium was the uterus, a criminal abortion having been performed.

Malaria is another disease in which rapid destruction of the blood cells takes place, and it is supposed that in some way quinine still further increases the hemolysis and thus precipitates the hemoglobinuria.

Wocht,¹ after reviewing the main symptoms and the various theories of the etiology of the black-water fever, expresses his opinion based upon the study of some 60 cases. The disease is not due to any specific infection, but is a disposition to hemolysis caused by a malarial infection. The immediate precipitating cause is always some chemical body, as antipyrin, phenacetin, or oftenest quinine. Wocht was not able to demonstrate any hemolysis in the blood of these cases, nor were the red blood corpuscles from these patients affected by the direct actions of quinine and other bodies in any way differently than the red corpuscles of normal individuals. The author believes that the liver, spleen, and kidneys have a hemolytic power which is increased by the malarial infection and is shown by the anemia, icteric color, and enlarged spleen. When the action of quinine is added to this, there is an acute increase in the blood dissolution and a hemoglobinuria results.

Vincent² made a brief report upon some experience which he has had in the treatment of hemoglobinuria and hematuria following malaria by the use of 60 to 90 grains of *calcium chloride* per day. He regards the malaria as the fundamental condition in cases of this sort, but not as a sufficient cause until the quinine is given. Quinine in solutions of 1 to 500 up to 1 to 1000 is a strong hemolytic and Vincent believes that the calcium chloride acts as an antihemolysin. In some cases he has been able, at will, to excite, prevent, or arrest an attack of hemoglobinemia by using quinine with or without the calcium chloride.

He, together with Dopter, has found that the calcium chloride has the same power *in vitro* and by means of one or two drops of a 10 per cent. solution of this salt they have been able to entirely stop hemolysis in a solution in which the red corpuscles otherwise undergo rapid and complete solution.

This protective action of the calcium chloride does not, however, extend to all hemolytics. Thus, it has an influence over the action of quinine, antipyrin, pyrogallol, salicylates, but not over the various hemolysins of bacterial origin.

If this work by Vincent and Dopter is confirmed by others, and clinical experience proves that the calcium chloride controls the hemoglobinuria, this work is most important. The test of its value rests with the men practising in malarial territories, and it is to be hoped that next year we may be able to add that the calcium chloride has been tried fully and not found wanting.

Brem,³ in an article based upon 14 cases of hemoglobinuria seen

¹ Münch. med. Woch., 1906, 53, 46.

² Comptes-rendus Societe de biologie, 1905, 59, 633.

³ Jour. Amer. Med. Assoc., 1906, ii.

in Ancon Hospital in the Panama Canal Zone, draws some conclusions which are not in accord with the opinions quoted above that quinine precipitates or at least favors the development of the black-water fever. On the other hand, he states that in every case the hemoglobinuria disappears more or less promptly following the administration of quinine by intramuscular injections, but quinine does not influence the excretion of hemoglobin after the production of hemoglobinemia during a paroxysm.

He concludes that the only discoverable etiological factor of the hemoglobinuria is a febrile affection resembling the estivoautumnal type of malarial fever. Previous attacks of malaria appear to exert a predisposing influence. Quinine was not an etiological factor, either predisposing or exciting. In this connection he points out among 1107 patients, who received as a part of the routine treatment of malaria from 20 to 40 grains of quinine daily, only 3 developed hemoglobinuria. Since those patients who are victims of the most severe infections are treated in the hospital, it would be anticipated that a greater number would develop hemoglobinuria from large and regular doses of quinine, if quinine were in any way an etiological factor.

Evidence appears to favor the view that the estivoautumnal parasite, and not a special organism, is the exciting cause.

The symptoms and signs of the disease may be very mild, and the gravity of the illness indicated by the urine examination only. A history of dark, black, or bloody urine can be obtained almost invariably.

The degree of fever bears no relation to the intensity of the hemoglobinuria and albuminuria. A posthemoglobinuric fever of peculiar character occurred in 4 of the cases observed by Brem. It was not influenced by quinine.

Blood examinations show that the primary event is destruction of the red blood corpuscles with hemoglobinemia and subsequent hemoglobinuria. Anemia is very rapid in its development and the rapidity of recovery is phenomenal.

In well-defined cases a practically absolute diagnosis can be made from a macroscopic examination of the urine combined with the test for albumin. In border-line cases a test for hemoglobin is necessary for absolute diagnosis, but a probable diagnosis can be made from a deeply colored urine with a brownish sediment and albumin of 20 per cent. or more.

The mortality in Brem's cases was 14.3 per cent., but the prognosis in individual cases is difficult.

The treatment consisted of the *intramuscular injections of quinine*. This appeared to act as a specific. The best method was thought to be the injection of 10 grains every four hours during the first forty-eight hours, and then smaller doses by mouth may be given if vomiting does not prevent. Quinine bishydrochloride in an excess of acid is more suitable than quinine bimuriate with urea for intramuscular injection.

Measles. There still continues a dearth of work directed toward the discovery of the causal organism of this disease, long recognized as one of the most serious which comes to young children.

However, Borini¹ reports the finding of a small, thin bacillus, usually in pairs, in cultures made from the blood of children with severe measles. The same organism was found in the bronchial and conjunctival secretions. The organism dies out after being transplanted a few times. The bacillus is pathogenic to the usual laboratory animals when inoculated into the trachea, pleura, peritoneum, blood, and nasal mucous membrane, causing death in from three to twelve days.

Among the more purely clinical articles is one covering a long series by Kien. This, like other statistical articles, adds to the mass of knowledge, though no particularly new facts are stated.

Kien² has an elaborate report upon the 1205 cases of measles observed in the Strassburg Children's Clinic during thirty years. Among many things of interest in this article, a few have been selected for remark. One thing of great interest is the striking periodicity of the epidemics, the cases being much more common every other year. Thus in 1898 there were 122 cases; in 1899, none; in 1900, 112; in 1901, 48. In a general way, the years showing much measles yielded few cases of scarlet fever, and vice versa.

The mortality rate for the entire thirty years was 17.3 per cent., but ranged from 13 to 43 per cent. in different years.

Kien also compares the mortality from scarlet fever and measles in Strassburg for a period of one hundred and seven years, and finds that the total number of deaths from measles is more than half again as many as those from scarlet fever.

The dangers of this disease are greatly influenced by the age of the patient. The mortality among 31 children less than one year was 58 per cent. From this point it fell rapidly after the first year and no deaths from measles in children over eleven years were noted.

One instance of a child born with the eruption is noted. The mother was ill with measles shortly before delivery, at which time she still showed evidences of the disease in the way of pigmented flecks over the entire body. Another case was noted in which the eruption appeared five days after the birth of a child, which was born on the eighth day of measles in the mother, *i. e.*, thirteen days, the incubation period for measles, after the onset of the disease in the mother.

Experience with special cases leads Kien to place the *incubation period of measles* at from ten to thirteen days. During later years especial attention has been paid to the *Koplik spots*, and they were found during the incubation period in 70 per cent. of the cases.

¹ Centralblatt f. Bakteriologie, 1 Abt., 40, 194.

² Jahrbuch f. Kinderheilkunde, 1906, 63, 139,

Relapse of the measles was seen six times during the last epidemic.

Of the various *complications* pneumonia is the most common and most fatal; of 166 cases 134 died, *i. e.*, a mortality of 80 per cent.

Complication of measles with croup and diphtheria of the tonsils was observed one hundred and five times with a mortality of 60 per cent. Cases of false croup are included, for the practice of making cultures from the throat has been in vogue only during the last ten years.

Kien also points out that the prognosis of scarlet fever complicated by measles is better than a measles complicated by scarlet fever.

It is, perhaps, unnecessary to lay any stress upon the well-established fact that pneumonia, usually bronchopneumonia, is the most serious of the numerous complications to which this disease is liable, the mortality being as high as 80 per cent. It is this complication, and the danger of subsequent tuberculosis, which makes this disease the serious one it is. One should always take measles seriously and take every care to prevent, if possible, the development of a complicating pneumonia. This emphatically does not mean keeping the child in a hot, poorly ventilated room.

The interrelation of diphtheria and measles has been pointed out in the section upon diphtheria.

Another variation from the type of this disease is reported by Leach,¹ who saw 4 cases of *relapse* within three weeks of the first attack, that is to say, the patients suffered from a complete second attack of the disease. Instances of such relapse in measles are unusual, but these 4 cases occurred in an epidemic of 262 cases.

Merk,² Professor of Dermatology in Innsbruck, reports an experience in his own family with *measles without eruption*. The possibility of this has been discussed at various times and a few such cases have been reported. The difficulties in the way of proof of the occurrence of measles without eruption are very great, but there seems no reason why this disease might not do as other eruptive diseases, like scarlet fever or typhoid. Three of Merk's children had typical measles and shortly after he and one child had an illness in all respects like the measles, but without the typical rash.

German Measles. Hildebrandt and Thomas³ have been studying the *white blood cells* in cases of German measles. They find that the cases show a leukopenia, usually the number of white corpuscles lying between 2840 and 5640. After the disease is over, the leukopenia is replaced by a moderate leukocytosis. Usually the leukopenia is best marked on the third day after the appearance of the eruption.

The number of neutrophile cells shows both an absolute and a relative decrease, making about one-half of the number of white cells.

¹ Lancet, December, 1905.

² Zeitschrift f. Heilkunde, 1905, 26, 579

³ Zeitschrift f. klin. Medizin, 1906, 59, 444.

In contrast to this the mononuclear cells show a relative increase, making usually from 47 to 61 per cent. of the cells.

The eosinophiles and basophiles show no change from the normal.

In the 1905 number of *PROGRESSIVE MEDICINE* it was pointed out that in measles there is an absolute leukopenia with relative leukocytosis, while this work shows the German measles to have an absolute leukopenia with relative lymphocytosis.

Mumps. Tiessier and Esmein¹ make a report upon a *bacteriological study of the blood and saliva* in 45 cases of epidemic parotitis. Blood cultures, made in the usual way, were obtained from 45 cases and were positive in 37. The negative results were apparently due to making the cultures too late, after defervescence. The cultures from the saliva were made from saliva obtained by catheterizing Steno's duct.

The organism obtained is described as a small coccus arranged singly, in pairs, or in tetrads, rarely in chains.

In a later article the same authors report that this organism is pathogenic to guinea-pigs, causing lesions comparable to those in the human and visceral lesions, similar in nature and localization to those found in humans dead of mumps.

Still later they report some experiments with seroagglutination as a means of diagnosis. Agglutination of this organism was obtained in 11 of 12 cases examined in dilutions ranging from 1 to 50 up to 1 to 100. In one case the agglutination developed in five minutes, but usually it appeared after about one hour and a half.

Pneumonia. This is in many ways the most important of the acute infectious diseases met with in temperate climates, and for this reason is the subject of continuous study and discussion. Unfortunately, so far, progress has been almost exclusively confined to matters of etiology, pathology, and symptomatology, while little has been accomplished in the way of prevention and cure.

PNEUMOCOCCI IN THE BLOOD. One of the most important discoveries concerning the nature of the disease is that the disease is a septicemia with usually special localization in the lungs. The pneumococci are present in the blood of all cases.

Whether or not they persist in the blood after the crisis is a matter of some importance, as is also the possible duration of such persistence. Rosenow found them in 4 of 8 cases in from four to thirty-six hours after the crisis; Baudel found them as late as twenty-five days; Tizzoni and Panichi as late as thirty to fifty-six days.

Wolf² reports finding them in 6 of 16 cases studied for periods varying from eight hours to seventeen days. Pneumococci isolated

¹ Compt.-rend. Soc. de biologie, 1906, 60, 803, 853, 897.

² Journal of Infectious Diseases, 1906, 3, 446.

after crisis are virulent for rabbits to the same degree as are the pre-critical organisms derived from the same patients.

As long as they continue in the blood, one must look for any one of the numerous complications and sequels which may result from the localization of the organisms in any tissue. It is, therefore, important to realize that the pneumococci may continue to be present in the blood for as long a period as seventeen days. The fact that they do not lose their virulence with the appearance of the crisis is also of practical as well as of theoretical interest.

VIABILITY OF THE PNEUMOCOCCUS. Wood¹ has been studying the *viability of the pneumococcus* after drying, a question which has an important bearing upon the epidemiology of this important disease, and draws the following conclusions:

1. In moist sputum kept in the dark, at room temperature, the average life of the pneumococcus is eleven days, though considerable variations may be noted in different specimens of sputum.

In the same sputum kept at 0° C. the average life is thirty-five days.

In sputum kept at room temperature and in a strong light the pneumococcus lives less than five days.

2. In dried sputum (a) in the dark the pneumococcus lives on an average thirty-five days; (b) in diffuse light, thirty days; (c) in sunlight, less than four hours.

3. In powdered sputum, even when kept in the dark, the death of the pneumococcus takes place in from one to four hours. When exposed to sunlight death occurs within an hour.

4. No important differences were noted in the life of the pneumococcus when dried on glass, tin, or wood. On cloth the life was usually slightly longer than on a non-absorbing surface.

5. Sprayed sputum particles remain in suspension for twenty-four hours, but all masses of a size sufficient to contain bacteria settle at a rate of 40 cm. per hour.

6. When sputum containing pneumococci is sprayed, the organism rarely survives for more than an hour and often dies in less time. The substance upon which the particles fall makes but little difference in the life of the organism. On cloth a slight prolongation is occasionally noted, due perhaps to the slow drying.

7. The mucus of the sputum exerts a destructive action on the pneumococcus.

Among other things this work shows the sanitary value of sunlight, which destroys the pneumococci in from one to four hours. The plan of caring for pneumonic patients in the open air has, therefore, a prophylactic as well as therapeutic value. The value of light and air is not even partially appreciated. They are too easily obtained to be estimated at their true worth.

¹ Journal of Experimental Medicine, 7, 592.

SECOND ATTACKS OF PNEUMONIA. Lépine and Froment¹ report a very unusual thing in the shape of a patient who had four attacks of pneumonia in the space of one year. There was an interval of eight months between the first and second attacks, three weeks between the second and third, and one month between the third and fourth. In each attack the fever fell by a lysis lasting three days, reaching normal on the tenth day of the disease. In each attack a new portion of the lung was involved.

The fact that a patient who once suffers from pneumonia is liable to a second attack is well established. Thus Grisolle found that 54 of 175 patients with pneumonia had previously had the same disease. The interval between the attacks varies greatly, but averages from three to five years. Exceptions are seen. Thus Andral saw one patient who suffered from fifteen attacks in eleven years.

INTRAUTERINE PNEUMONIA. Bochenski and Gröbel report a case of *intrauterine pneumonia*, which is interesting because there are so few of them recorded, although they are doubtless more common than one might infer from the number reported.

The mother aborted on the third day of a right-sided pneumonia. The child was cyanotic and dyspneic and showed dulness, with sharpened breathing and fine rales over the lungs. It died eleven hours later and the autopsy showed an extensive pneumonia which was proved to be due to the Fränkel-Weichselbaum diplococcus.

The placenta was not examined histologically, but there is no reason why the placenta should not be permeable to the pneumococcus, as it has proven to be to many other bacteria.

GLYCOSURIA IN PNEUMONIA. The appearance of sugar in the urine during or shortly after acute infections has been noted a few times. Many of these cases are after carbuncle or furunculosis, where one has a right to suspect that the glycosuria preceded rather than followed the pus infection. It has also been seen a few times after scarlet fever, measles, whooping-cough, and influenza. The only infectious disease, however, which is associated with glycosuria with any degree of frequency is malaria. I have never personally encountered an instance of pneumonia followed by glycosuria, and therefore note with interest an article by Rosenberger² upon glycosuria appearing in the course of acute croupous pneumonia. He draws the following conclusions: During the course of acute infectious diseases, one sometimes finds in the urine a carbohydrate of a still undetermined nature and due to some yet unknown cause. It usually persists for a very short time and is present in very small amounts. Neither the quantity, specific gravity, nor the appearance of the urine will suggest its presence, and Rosenberger suggests the examination of repeated single specimens of urine rather than twenty-four-hour specimens.

¹ Revue de médecine, 1906, 107.

² Deutsch. med. Woch., 1906, 994.

As far as present knowledge goes the excretion of the sugar stops promptly and of itself, and it has no influence upon the course of the pneumonia.

This is certainly a rare happening, for in most hospitals all urines are examined as a matter of routine for sugar, and yet so far as I know this is the first instance recorded.

KNEE JERK IN PNEUMONIA. Last year attention was drawn to the effect which diphtheria has upon the knee and Achilles jerk, and this year Barnes¹ has an article upon the knee jerk in pneumonia. He examined a number of cases of pulmonary consolidation due to various causes, among which were 34 cases of pneumococcus pneumonia. In 30 of these the knee jerk was lost at some period during the stay in the hospital; of these 12 died. It is only in the later stages of the disease that the knee jerk is constantly affected. In one case in which the pneumonia developed in the hospital, the knee jerk was normal on the third day, disappeared on the fourth, and reappeared on the ninth, two days after the crisis.

In many other cases the jerk was lost on the fourth day, in several on the third, in some on the second, and in two fulminating cases it disappeared within the first twenty-four hours after the presumed onset of the disease.

The date when the jerk disappeared had no bearing upon the date of the crisis. The reappearance usually occurred two or three days after the crisis, but in the cases ending by lysis it sometimes reappeared before the temperature was normal.

Barnes believes that the loss of the knee jerk is due to a special action which the toxins have upon the nervous system, and studied the third lumbar section in such cases as went to postmortem. The only changes to be found were shown by the Nissl method and were chiefly in the large motor cells of the anterior horn. These showed all the earlier stages of chromatolysis, and in one recent case, dying after high fever of fourteen days' duration, all the cells showed more or less complete diffusion of the tigroid bodies and eccentricity of the nucleus.

Barnes believes that one is warranted in inferring that the infective agent is not the pneumococcus when the knee jerks persist in spite of an existence of consolidation of the lungs with fever. If the knee jerk disappears before the third day the prognosis is not as good as if it remained to a later stage of the disease.

Changes in the tendon reflexes have been noted so often and in so many infectious processes that it does not appear to me likely that Barnes is correct in his inference that if the knee jerk persists the pneumonia is not due to the pneumococcus.

I think we can look upon the loss of the knee or Achilles jerk as an

¹ Birmingham Medical Review, April, 1906.

expression of the intensity of the infection rather than as a result of the nature of the infecting organism. The early and complete loss of these tendon reflexes may be regarded as an unfavorable prognostic sign, but one cannot be too careful about drawing prognostic inferences from any one sign; the whole clinical picture must be considered, and here as elsewhere one cannot be too guarded in expressing an opinion as to the prognosis.

APICAL PNEUMONIA AND TACHYCARDIA. Pal¹ reports a couple of cases of pneumonia involving the upper lobes, associated with extreme tachycardia. In one patient, a woman, aged 57 years, with a pneumonia beginning in the left upper lobe, the pulse rate reached 190 on the sixth day. Later the pulse rate fell to 120; the patient died on the eighth day.

In the other case, the highest pulse rate was 180, and the patient recovered.

Pal believes that the tachycardia is due to irritation of the accelerator fibres in the sympathetic rather than paralysis of the vagus.

It has been repeatedly pointed out by a large number of observers that a pneumonia of an upper lobe is especially serious, and shows a considerable higher mortality than pneumonia of either lower lobe, although the latter are considerably larger.

Not only does one see the unusual phenomena pictured by Pal, but also and much more frequently those described below by Lederer.

CEREBRAL PNEUMONIA. Lederer during the past three years had nine opportunities of observing, in the Franz-Josefs-Spital in Prag, the clinical picture spoken of as cerebral pneumonia. In all cases either one or both apices were involved in the pneumonic process. The eclamptic group of symptoms was seen but once in a child of six months; the other 8 cases showed meningeal symptoms; six of these cases became comatose and 2 delirious. All the cases were in children; all ran a severe course, often with a delayed crisis, but all recovered.

The cause of the cerebral irritation lies, no doubt, in a number of factors, but the active cause is probably the toxins.

This type of crupous pneumonia is uncommon, yet frequent enough to demand some attention. It has been the subject of numerous communications, in some of which proper attention has been given to the importance of the localization of the pneumonia. Most of the cases are like the 9 recorded by Lederer, in one or both upper lobes. It is probable that pneumonia in this portion of the lungs interferes, to some degree, with the return circulation through the jugulars. In this way the nutrition of the brain is lessened, and it is more exposed to the action of the pneumotoxins than it would be if the circulation in the jugular was normal.

In addition to the eclamptic, convulsive, and delirious types of cases,

¹ Wien. med. Woch., 1906, 56-10.

one should include the paralytic cases, characterized by transient monoplegia or hemiplegia. I reported an instance of this sort some years ago.

GANGRENE OF LEGS FOLLOWING PNEUMONIA. A fortunately uncommon complication of pneumonia is recorded by Attix,¹ who had a patient develop gangrene of both legs following embolism of the femoral arteries. On what was presumably the twelfth day of a pneumonia of the right lower lobe, the patient experienced pain and tenderness of the thigh followed by gangrene. The same thing happened in the left leg from the popliteal space down. Autopsy showed an embolism of the vessels.

The source of the emboli was not determined because of the limited postmortem. Clinically there were no signs of an endocarditis, which, however, does not exclude its existence. The emboli can, however, be referred to endocardial thrombi, such as may develop in the course of any severe infection.

This case may be compared with those of hemiplegia described by Rolleston in the paragraphs upon diphtheria, the only difference being in the localization of the embolus. This same unfortunate accident has been repeatedly described, especially in connection with typhoid fever. In pneumonia the source of the emboli is usually endocardial vegetations, but in prolonged and exhausting illnesses, like typhoid, the heart may be so weakened as to permit of the formation of clots among the muscular trabeculæ of the left ventricle. When the heart strength improves, such clots may be dislodged and cause symptoms, according to the vessel in which they lodge.

The increase in the fibrin, a factor which is so marked in pneumococcus infections, would lead one to expect such thrombi more often in pneumonia than in other infections, but, as a matter of fact, thrombosis anywhere in the circular system is one of the rare complications of pneumonia.

DOUBLE EMPYEMA FOLLOWING DOUBLE PNEUMONIA. Nordmann and Montot have been led, by a personal experience with a case of double empyema following a double pneumonia, to review the literature of the subject.

Including their own case, they were able to assemble 57 cases; all but 5 of these cases were children. The great bulk of the cases of double empyema were secondary to pneumonia, though a few followed bronchopneumonia or influenza.

Some of the patients have been treated by repeated puncture, others by incision. Good and bad results have been obtained by either method.

I have recently had an opportunity of observing what was apparently a later result of an empyema in the shape of *chorea*. The patient was

¹ Jour. Amer. Med. Assoc., 1906, 46-1287.

a boy, aged nineteen years, who developed an empyema which was drained and healed after an illness of some months. With the closure of the empyema he developed a rather violent chorea. It is, of course, impossible to say whether this is an instance of *post* or *propter hoc*, but it is an interesting observation whichever it is.

TREATMENT OF PNEUMONIA. It is a matter for serious regret that one can add nothing particular upon the matter of treatment. There have been the usual number of articles advocating this or that specific, but unfortunately none of the articles is sufficiently convincing to lead one to try again that which has been tried and found wanting.

One sees rather less of the articles urging the use of the creasote derivatives, and one can safely predict their complete disappearance within a short time.

Last year in **PROGRESSIVE MEDICINE** mention was made of the fact that quinine was being advocated as a specific in pneumonia when given in large doses.

The basis of Galbraith's¹ confidence in the use of quinine in the treatment of pneumonia is purely clinical, and his report would be more convincing were it not for the fact that medical literature is full of accounts of specific methods of treatment based upon pure empiricism, and of the thousands of such specifics only mercury and iodides for syphilis and quinine for malaria have stood the test of time. Moreover, among those abandoned specifics is quinine for pneumonia. Years ago this same drug was used in large doses and then abandoned.

There have also been a few articles upon the use of *pneumococcus serums*, among which we will mention one by Tartaro, who used Pane's serum, and by Winckelmann, who used the Römer serum. Neither article is at all stimulating to confidence in sera against pneumococcus infections.

Tartaro² reports his personal experience with 25 cases of pneumonia treated with the Pane serum. There were two deaths. Because of the expense much less serum than the amounts advised by Pane were given. The author concludes that while the local phenomena of the disease is unaffected, the gravity of the general symptoms is lessened. Subjectively the patients feel better. The cyanosis disappears and the temperature falls from one to three or four degrees, but the course of the disease is not shortened.

It is impossible to estimate the value of such a report, because the conclusions are based largely upon things which are matters of opinion and in no way ponderable. It, however, constitutes an addition of 25 cases to the statistics.

Winckelmann³ has employed the Römer antipneumococcus serum

¹ Jour. Amer. Med. Assoc., 1906, 46, 410

² Buffalo Medical Journal, 1906, 61, 631. ³ Münch. med. Woch., 1906, 53, 25.

in 16 severe cases of pneumonia. In the reports so far published, subjective improvement is frequently noted, and it occurred in 6 of this series of cases, but was not very marked in any.

The physical signs were unchanged in 6 cases; in 4 cases signs of resolution began in from twelve to twenty-four hours after the injection (on the sixth to eighth day of the disease); in 1 case resolution began after one day, in 2 after two days, and in 3 cases the process extended to other lobes.

The pulse remained, after the injection, in the usual relation to the temperature, and the blood pressure was uninfluenced.

The number of leukocytes was not affected by the serum.

Winckelmann could not see that the temperature was materially influenced by the injections, nor was the crisis hastened or made more certain.

Of the 16 cases 5 died. So far reports of 51 cases treated with this serum have appeared with a mortality of 17.6 per cent.

In spite of these quite negative results, the author thinks the serum should be used in severe cases. One can most cordially agree with another conclusion, namely, that the serum is very probably quite harmless.

Fresh-air Treatment of Pneumonia. Anders¹ expresses his approval of the fresh-air treatment of respiratory affections, especially pneumonia. The advantages, he holds, are the combined effects of lowering the fever, a bracing tonic effect on the nervous system, supplying the patient with oxygen. There is no danger of the patient taking cold.

One must agree with all this. The patients treated in this way are far more comfortable than when kept in a close room with a tank of oxygen. The dyspnea, cyanosis, restlessness, and insomnia are all improved. It is, however, hard on the nurse, who often must wear heavy wraps, although the patient is comfortable with light bed-clothing.

As I have repeatedly said in these articles and elsewhere, the fresh-air treatment of pneumonia constitutes the sole advance along this line for a long time. It is not possible for these cases to have too much air, and there is no danger of the air being too cold. One still meets with prejudice on the part of the family, but this can usually be easily overcome, and the beneficial effects upon the patient are so prompt that all opposition quickly ceases.

In this connection I wish to make a further protest against the use of *pastes* and *poultices on the chest*. I recently saw a woman breathing from forty to fifty times per minute because of a pneumonia, who had on her chest by actual measurement a poultice weighing three pounds. It is a matter of very simple mathematics to show that this woman was lifting with her chest, one hundred and thirty-five pounds per minute,

¹ Medical Record, July 7, 1906

and something over four tons per hour. I am sure that this additional work far outbalanced any questionable benefit she may have derived from the moist heat of the poultice.

Acute Articular Rheumatism. ETIOLOGY. The results obtained by the various observers who have been studying the etiology of this disease have varied so greatly that one must still reserve his opinion as to the specificness of the micrococcus rheumaticus. The question of the etiology is so well summed up in an article by Cole,¹ in which he reviews the various theories, that I quote him *verbatim*: "I greatly fear that we are not yet in a position to make any positive statements as to the etiology of this disease. It seems to me there are at least three possibilities. First, that acute articular rheumatism is a definite, specific infectious disease, the cause of which we do not know, and that the cocci which have been isolated were secondary invaders. Second, that there is no such specific disease as acute articular rheumatism, but that the cases grouped under this term are those of mild and moderately severe cases of general streptococcus infection, in which the joints and heart are generally involved. Third, that acute articular rheumatism is due to a special form of streptococcus, which at present we have no accurate method of distinguishing from streptococcus pyogenes, but which, owing to the specific character of the lesions induced in man, must possess special characteristics."

This appears to me a reasonable statement of our knowledge today, and I would merely point out that it accepts as a fact that this disease is of infectious origin, but leaves open the question of the specificness of the infecting agent.

This article by Cole is to be contrasted with one by Poynton and Paine² in which they repeat with emphasis their opinion that acute articular rheumatism is a specific infectious disease, and while they admit the not infrequent difficulty in differentiating the true from the false cases, they nevertheless insist that true cases of the acute rheumatism are always due to the *diplococcus rheumaticus*. In a second part of their article, devoted to a consideration of *rheumatic chorea*, they review the cases previously reported in which diplococci were found in the cerebrospinal fluids of fatal cases of chorea, and add 2 new personal cases. They conclude that rheumatic chorea will prove to be a local infection of the nervous system, and that most of the symptoms are the result of a slight meningoencephalitis and possibly meningo-myelitis. Their reasons for this belief are: (1) The isolation and cultivation of the diplococcus from the cerebrospinal fluid in 4 cases of fatal rheumatism, in 3 of which there was chorea at the time of death. (2) The production in rabbits of twitching movements, arthritis,

¹ New York Medical Journal, 1906, 83, 334.

² Lancet, December 16, 1905.

endocarditis, and pericarditis by the intravenous injection of the diplococcus. (3) The demonstration of the diplococcus in the cerebral pia mater, and once in the brain from 3 cases of chorea. (4) The demonstration of the diplococcus in the brain and pia mater of rabbits that had shown twitching movements.

Such results as these must be noted with attention, and the conclusion that rheumatism is due to this particular and specific diplococcus would be accepted, were it not for the fact that so many other observers have failed to find this organism, although it should be stated that a few have done so. The constancy of the clinical picture presented by rheumatism, and the greater frequency with which certain complications appear in this disease, suggest strongly that it is due to specific organism. Poynton, Paine, and Walker have presented much direct and collateral evidence in support of the claims of the micrococcus rheumaticus, but nevertheless the question is still open.

RHEUMATISM IN CHILDHOOD. McDonough,¹ in an article upon the manifestations of rheumatism in childhood, states that he finds that children suffering from the so-called "growing pains" show a rise of temperature, muscular spasms, and tenderness in muscles and joints, that such children are liable to attacks of tonsillitis, and that the pains are relieved by rheumatic treatment.

The rheumatic nature of these muscular pains of childhood has been assumed for some years, but I do not recall having seen before the statement that they are accompanied by a rise in temperature.

A report of the cases of rheumatism in the Anna Children's Hospital in Graz² contains much that is of interest. It covers 129 cases. In accordance with experience elsewhere, cases under four years of age were very exceptional, although mention is made of a case in a child of ten months. The great majority of the cases were distributed evenly between the ages of five and fifteen. There were 64 boys and 65 girls, as even a sex distribution as is possible.

The influence of heredity and family predisposition was studied, and in 50.7 per cent. of the cases polyarthritis had occurred in other members of the family. Too much stress must not be laid upon this, for the children were exposed to the same, often very injurious, influences which may have been active in causing this disease in other members of the family.

The cases were distributed pretty evenly throughout the year, except for May, which shows an undue number of cases, and August, which yielded too few.

In general the first symptoms were those referable to the joints, but in some the symptoms usual with infectious processes in general were first noted, and in some there were symptoms of a throat infection.

¹ New York Medical Journal, 1906, 83, 346.

² Wien. klin. Woch., 1906, 563.

In general the course was milder than that usually seen in adults, but because of the prompt influence of the salicylates none of the cases was allowed to run a natural course. In many of the older children the course was intermittent and protracted, and in each successive attack the effect of the salicylates became less and less marked.

In 127 cases there were 643 joints involved, distributed as follows:

Ankle	$\left\{ \begin{array}{l} R \ 86 \\ L \ 102 \end{array} \right\} = 188$	Wrist	$\left\{ \begin{array}{l} R \ 30 \\ L \ 37 \end{array} \right\} = 67$	Finger	$\left\{ \begin{array}{l} R \ 19 \\ L \ 16 \end{array} \right\} = 35$
Knee	$\left\{ \begin{array}{l} R \ 80 \\ L \ 85 \end{array} \right\} = 165$	Elbow	$\left\{ \begin{array}{l} R \ 28 \\ L \ 28 \end{array} \right\} = 56$		

Other joints were involved with less frequency.

The ankle was among the first joints involved in 97 per cent. of the cases, the knee in 73 per cent., the wrist in 22 per cent. The other joints in much less percentage.

Endocarditis developed in about 70 per cent. of the cases. The frequency of this complication of acute articular rheumatism has been variously stated by different authors, the figures ranging from 91 per cent. to 43 per cent., most of them, however, being over 75 per cent. The influence of sex is strikingly shown, for while 44 per cent. of the boys developed endocarditis, the percentage of the girls was 95.4. The influence of sex is seen also to be the same in the causation of chorea; 5 per cent. of the boys developed chorea and 20 per cent. of the girls.

Of 43 cases of endocarditis which could be followed subsequently, 8 apparently recovered after months or years, while the others showed organic valvular lesions with subsequent myocarditis.

One of the most important statements contained in this report is the greater frequency with which endocarditis developed in girls than in boys. This is in variance with the statements usually made upon this point Pribram, for example, stating that sex has no appreciable effect upon the frequency of cardiac complications of rheumatism. This report from Graz would lead one to be more careful of the girls with rheumatism, and to insist upon their remaining at rest in bed for a long period after all joint manifestations have ended.

RHEUMATISM AND GRAVES' DISEASE. W. E. Robinson¹ publishes an article upon the relationship between Graves' disease and acute articular rheumatism. His attention was drawn to the question by a patient who developed an attack of acute rheumatism six months after the onset of Graves' disease. The salicylates given for the rheumatism brought about improvement of the symptoms of the Graves' disease. Robinson in looking into the question found that during seventeen years there have been 127 cases of Graves' disease in Guy's Hospital, London, and of these 18.9 per cent. gave a definite history of acute rheumatism.

During the past twenty years there have been a number of articles

¹ Lancet, 1906, 1, 1037.

upon this subject. West in 1886 reported 38 cases of Graves' disease, 8 of which gave a history of acute rheumatism. In 1890 Mackenzie collected 40 cases, 9 of which had had quinsy and 5 acute rheumatism. In 1893 Thompson reported 8 cases, 3 of which gave a history of acute rheumatism. Isolated cases have been reported elsewhere, and Babinski reports favorable results from the use of salicylates in Graves' disease without pointing out any possible relation between the two diseases.

The question is interesting, as are all questions which may have any bearing upon the explanation of Graves' disease.

SWELLING OF THE THYROID GLAND IN RHEUMATISM. In this connection it may be of interest to point out that Vincent¹ has recently drawn attention to a painful swelling of the thyroid, which he has observed in something over 50 per cent. of his cases of acute articular rheumatism which were severe or moderately severe with fever. This swelling is most marked at the onset, and while the gland is not spontaneously painful, it is tender to pressure. Usually both halves of the gland are swollen, but the reaction may be confined to one-half. The swelling and tenderness disappear with the improvement of the other symptoms. Vincent does not regard this as peculiar to rheumatism, but thinks it is a defensive reaction against the infection, and that it occurs in many infectious diseases other than rheumatism. He has found the same tumefaction of the thyroid in 11 of 17 cases of typhoid, 1 of 4 cases of meningitis, 7 of 15 cases of measles, 9 of 19 cases of scarlet fever, 1 of 9 cases of mumps, 2 of 2 cases of erythema nodosum, and 2 of 5 cases of acute malaria. These observations lead him to think that the secretion of the thyroid gland plays a part in the defense of the organism against intoxications of microbic origin.

SUDDEN DEATHS IN RHEUMATISM. We are so accustomed to seeing patients suffering from acute articular rheumatism recover after a more or less prolonged illness that we are apt to forget that this disease has other dangers than its complications. It is therefore well to have pointed out, at intervals, the fact that sudden death may occur in its course. Gouget,² in a report upon a sudden death in a patient with acute rheumatism complicated by acute endocarditis, points out that sudden deaths may occur in three ways.

1. Cerebral disturbances may appear without warning, usually early in the course of the disease, and be combined with delirium, death usually resulting in the course of a few hours. Anatomically only a slight hyperemia of the meninges is found. Probably alcoholism has something to do with this.

2. Sudden death in syncope, without there having been any previous

¹ Bulletin et mémoires Soc. méd. Paris, 1906, 23, 598.

² Presse médicale, 1905, 39.

evidences of cardiac weakness or disease. Both ventricles of the heart are found dilated, and there is a diffuse myocarditis.

3. Death due to subacute asphyxia. Here come the cases of pulmonary edema, embolism of the pulmonary artery, and intracardiac thrombosis.

ASPIRATION OF JOINTS IN RHEUMATISM. Cordeiro briefly reports a case of acute articular rheumatism treated by aspiration. At intervals some one proposes the introduction of surgical measures in the treatment of this disease. Even such radical measures as opening the joints and draining them with rubber tubes have been suggested and performed. Such methods are to be absolutely condemned except under very unusual circumstances. One will occasionally, but only very occasionally, see a joint which will be benefited by aspiration, but it must be understood that even this method is rarely needed.

One must keep in mind the fact that rheumatism is not yet a sharply outlined disease, but merges with gradations into sepsis, and that for this reason hard and fixed rules cannot be suggested or followed in the treatment of the cases.

EFFECT OF THE SALICYLATES ON THE KIDNEYS. Pässler¹ of Dresden, discusses the propriety of using salicylates in the treatment of cases of acute articular rheumatism in which nephritis exists either as an antecedent condition or as a sequence of the rheumatism.

The effects of salicylates upon the kidneys have been studied for some years, and while all agree that these bodies are quite capable of exciting nephritis, the harm done is transient and constitutes no strong contraindication to their use. Pässler recently had a case of severe acute rheumatism in a boy with a severe nephritis, and after due consideration decided that it was more important to combat the rheumatism and lessen in this way the danger of an acute exacerbation of an old endocarditis, a relic of an earlier attack of rheumatism, than to protect the kidneys from the injurious influence of full doses of salicylates. The result justified the use of the *aspirin*, for both the rheumatism and the nephritis were benefited.

Scarlet Fever. During the year no further progress has been made toward the identification of the cause of this most important disease, and the articles which have appeared have been mainly in regard to the use of the polyvalent serum of Moser, to the management of the diet, and to the consideration of the various complications.

SERUM TREATMENT OF SCARLET FEVER. The men who have been so fortunate as to be able to get Moser's serum continue to report favorable effects from its use. As would be expected, the longest list of cases comes from the clinic of Escherich, in which the serum was first manufactured. It is greatly to be regretted that others who have attempted to make a similar serum have so generally failed.

¹ Therapie der Gegenwart, 1906, 52

Schick¹ from Escherich's clinic publishes the results of the later work upon the use of the Moser serum in scarlet fever; 60 cases are added, making in all 198 cases so far treated in this way at this clinic.

Eight of these cases were regarded as moderately severe and all recovered; of 42 cases, ill seriously enough to make a fatal prognosis probable, 8 cases died, while 7 of 10 cases, in which an absolutely bad prognosis was made, recovered. The total mortality for the 60 cases was 16.6 per cent.

The mortality is greatly influenced by the date of the disease at which the serum is given. Thus of 35 cases injected during the first three days of the disease only 1 died, 4 of 13 cases injected on the fourth day died, and 3 injected respectively on the seventh, eighth, and eleventh days died. It is probable that the serum has no effect if given later than the third day of the disease.

As in the earlier reports from this and other clinics, it is insisted that the value of the serum is more clearly shown by its effects upon individual cases, especially those of the severe toxic type, than by the reports of the average mortality.

The effects of the serum begin to appear usually between the fourth and the seventh hours after the injection.

The blood serum of scarlet-fever patients agglutinates the streptococci from the heart blood of fatal cases, but feebly, usually not in higher dilutions than 1 to 8.

The Moser serum agglutinates them even in very high dilutions. When the serum of a scarlet-fever patient begins to cause agglutination of the streptococci, one can infer that the Moser serum administered is being absorbed, which, as already stated, is in from four to seven hours after the injection. It is about this time also that the temperature begins to fall. Among the 60 cases added in this report there were 26 which showed a fall of 2° C. within twenty-four hours and 4 showed a fall of more than 3°. The later the injection is given, the less is the effect upon the temperature.

The serum treatment lessens the danger of nephritis. Of the 11 fatal cases, 4 showed nephritis, while it occurred in only 2 of the 49 cases which recovered.

In most of the cases 200 c.c. of the serum were used, but in some as much as 400 c.c. were given. These large amounts of serum, which it was necessary to use, probably account for the fact that serum rashes appeared in 75 per cent. of the cases.

To the article is added a complete list of the literature which has so far appeared on this subject.

Bukowski² publishes a favorable report upon the use of the Moser

¹ Deutsch. med. Woch., 1905, 2092.

² Wien. klin. Wochen., 1905, 1277.

polyvalent serum in the treatment of a small series of scarlet-fever cases. The serum was used in doses of 100 and 200 c.c. and was followed by a surprisingly rapid improvement in the nervous symptoms. The pulse and temperature improved. The remissions of the next day were deeper and in 5 cases of 15 the temperature reached normal on the day following the injection.

During 1905, 11 other cases were treated, and the experience with these cases strengthened the favorable impression received from earlier cases, so that Bukowski believes we have in the Moser serum a potent therapeutic agent against scarlet fever.

DIET IN SCARLET FEVER. Last year reference was made to the replacing of the absolute milk diet in scarlet fever by a chloride-free diet. This year there have been a number of articles upon the same subject.

Pater¹ studied the effects of an absolute milk diet and a chloride-free diet consisting of bread made without salt, puré of potatoes, rice with milk, and eggs, noting not only the effects upon the albuminuria, but also upon the body weight, the chloride and urea excretions.

He concludes that the chloride-free diet is no more likely, and possibly less likely, to cause nephritis than the absolute milk diet. If a febrile albuminuria exists at the onset of the disease, it disappears. This diet may be given from the start, or may be delayed until the fever ends. The chloride-free diet has the advantage of being more acceptable to the average patient, and the more important advantage of causing an earlier and more rapid gain in weight.

On the absolute milk diet the patients lose weight rapidly until a minimum is attained. The weight remains at this level until the milk diet is replaced by solid food, when the weight previous to the infection is regained. Upon the diet advocated by Pater, the weight begins to increase as soon as the diet is instituted and increases steadily.

Dufour in the same journal (page 135) publishes an addition of 107 cases to those noted in the 1906 number of *PROGRESSIVE MEDICINE*. This makes a total of 375 cases with 6 deaths, which Dufour has treated with a solid, chloride-free diet. He believes that complications are less frequent, and that when they do appear the patient is in better condition to resist them.

In a later article² Pater repeats his conclusions, and publishes some interesting curves showing the effect of the chloride-free diet upon the body weight. He affirms that nephritis is no more likely to appear, possibly less so, and that a febrile albuminuria will disappear under this diet.

Another article bearing upon this same subject is contributed by Risel,³ who reports observations upon 82 children treated for the first

¹ Bulletin et mémoires de la Soc. méd. de Paris, 1906, 93.

² La presse médicale, 1906, 318.

³ Zeitschrift f. klinische Medizin, 59, 340.

three weeks of a scarlet fever with an exclusive milk diet. He finds that while most of the children lose weight during the period in which they were fed exclusively upon milk, all except 2 left the hospital with a greater weight than that shown at entrance, and that many of them began to gain weight before the milk diet was supplemented by solid food. The average number of days during which the children lost weight after entering the hospital varied in different age classes, and ranged from 7.2 days to 13.8 days.

The average loss of weight in the various age classes ranged from 16.98 grams to 42.71 grams per kilo of the body weight, while the average increase shown at the time of leaving the hospital ranged from 81.6 grams to 131.9 grams per kilo.

A comparison of the number of calories given the children with the number which children of like age should receive shows that during the first five days the children are underfed, while later they are overfed.

Risel concludes that one need fear no inanition from the milk diet, for while there is a loss of weight at first, they all begin to gain weight while still on this diet, and continue to do so later when other articles of diet are added.

It seems to me too early to accept the conclusions of those who are advocating the chloride-free diet as a substitute for the absolute milk diet. The latter has been tried for so many years, and through so many epidemics in which nephritis has been common, that it would seem best to continue its use until an opportunity arises to try the chloride-free diet in an epidemic, characterized by the frequency with which nephritis develops as a complication.

SCARLATINAL NEPHRITIS. Chapman,¹ in a study of the kidneys in cases of scarlet fever, endeavors to discover some relation between the clinical and pathological findings, and concludes that the classification of the cases by their clinical features coincides with certain main types of pathological changes. Three classes were distinguished, as follows:

Class 1 includes cases with a definite history of acute nephritis commencing about the third week. The changes primarily affect the Malpighian corpuscles, and consist of proliferative and degenerative changes in the vessels and cells. The changes in the tubules were largely secondary and less characteristic, and were of the nature of granular degeneration. The albuminuria was probably due to changes in the Malpighian corpuscles, and the hematuria arose from direct hemorrhage into the tubules. Tube casts were most frequently found in the junctional tubules, and it was pointed out that all the tube casts reaching the urine were probably formed in the smaller junctional tubules, and that their granular portions resulted from the disintegration of the cells of the convoluted tubules and the ascending loops of Henle.

¹ Journal of Pathology and Bacteriology, 1906, 11, 276.

Class 2 includes cases dying within a few days of the onset of the fever. In these the pathological changes were neither so marked or so characteristic. They consisted largely of granular and hyaline degeneration of the tubular epithelium. A degenerative nephritis is typical of this group.

Class 3 includes cases dying after six days or more from the onset of the fever. In these associated with a high degree of tubular degeneration, there was an infiltration of the interstitial tissue.

Thus cases showing during life unequivocal signs of acute nephritis have a glomerular nephritis, cases dying during the first few days have a degenerative nephritis, while those dying after six days show an acute interstitial nephritis.

JAUNDICE IN SCARLET FEVER. The occurrence of icterus as a complication is so infrequent that it is not mentioned in the usual text-book articles. It, however, is seen at intervals, and the cases can be separated into two very different types. In one group the icterus is a manifestation of an extremely severe infection associated with extensive degeneration of all the organs, especially of the liver and kidneys, causing a clinical picture much like that of the acute yellow atrophy. Such cases, while they may occur sporadically, are more frequently seen in certain epidemics.

In the other group the icterus is the result of a simple catarrh of the duodenum and gall ducts. In these cases the prognosis is no worse than in the ordinary cases of scarlet fever.

Gross¹ reports 2 cases of the latter type, both ending in recovery. He notes the infrequency of this complication, having seen it but twice in a series of 130 cases.

Kaupe² reports a similar case, and suggests that in some cases the jaundice may be due to compression of the duct by swollen lymphatic glands at the porta.

PSYCHOSES AFTER SCARLET FEVER have been described at intervals by various authors, but they are fortunately rare, according to Moureyre in 1.5 per cent. of the cases. Jezierski³ reports 3 cases of acute psychical disturbances in children convalescent from scarlet fever. The family history in all these showed no cases of insanity. The prognosis must be cautious. A brain which reacts in this way to a fever or to the specific influences of an infection must be regarded as of lessened resistance and liable to remain permanently affected or become seriously affected by some later influence. About one-half of the cases of this sort remain permanently feeble-minded, while the other half recover.

Smallpox. ETIOLOGY. But little has appeared during the year upon this disease. Interest was aroused by the work of Councilman upon the causation of this disease, and it now appears that the work

¹ Münch. med. Woch., November, 1905.

² Ibid., February, 1906.

³ Medizinische Klinik, 1905, 1283.

has been continued elsewhere, under circumstances which are more favorable to it.

The *Journal of Medical Research*, volume 14, page 223, contains a very interesting report of work by Brinckerhoff and Tyzzer upon experimental variola and vaccinia in quadrumana. This work is a continuation of that of Councilman upon smallpox, and was carried on in Manila. It also confirms and strengthens what was stated in earlier publications concerning the cytotyctes. The authors feel sure that the inclusions in the cells are living organisms. It seems also sure that the organism described does not conform to the type of other known organisms. The evidence that the things described are living comes in part from analogy of structure with other things which are recognized as living organisms, and in part from the analogy with living things which they give by progressive growth and differentiation of structure. Certain forms are found at certain intervals of time and they occur in sequence.

The experimenters were able to produce in monkeys by inoculation with smallpox virus a disease which most closely corresponds to the variola inoculata in man. The monkey, however, is not susceptible to an air-borne virus. The disease was never transmitted from an infected animal to others in the same cage.

Experiments were made in the Philippines with reference to the immunity produced by vaccinia as compared with that produced by variola inoculata. It was found that the immunity produced by vaccinia is stronger and more fully protective than that produced by variola inoculata. Further, vaccinia is a more potent virus than that of variola. It was found easier to produce immunity to variola inoculata than to vaccinia.

Tuberculosis. FREQUENCY OF TUBERCULOSIS. This year, as every year, has seen an immense addition to the literature of this disease, and naturally only a few of the articles can be referred to. One article, which has an important bearing upon our attitude toward this disease, is that of Burkhardt, in which it is shown that tuberculosis is practically universal among people over the age of eighteen.

The article, while largely statistical, deserves careful reading and thought, and serves as a further confirmation of the practical rule that where tuberculosis of the lungs seems a reasonable probability it is practically certain to be present.

Until recently there have been but two reports upon the frequency of tuberculosis in man which were extensive and based upon careful postmortem examination. To these Burkhardt¹ adds a third report, more than twice as large as the other two combined, and covering about 1400 bodies examined in the laboratory of Schmorl. Burkhardt follows

¹ Zeitschrift f. Hygiene, 1906, 53, 139.

the lines laid down by Nägeli in his report of 1900, and adopts eighteen as the age limit of the children. From fourteen to seventeen the tuberculosis is often absent, and from eighteen years on is again met with increasing frequency.

Of the 1452 autopsies 190 were on children, and of these 118 were free from tuberculosis; 72 showed tuberculosis, and in 35 this disease was the cause of death. This gives a frequency of tuberculosis in childhood of 38 per cent., about twice that shown in Nägeli's statistics (18 per cent.). There were but 7 instances of healed tuberculosis, all in the lungs and all in late childhood.

The tuberculous lesions were found in the lungs thirty-six times; bronchial glands fifty-eight times; cervical glands twenty-six times; mesenteric glands thirty times; intestines twenty-two times; kidney twelve times; brain and spinal cord eleven times.

Between the ages of six weeks and twelve months there were 9 cases, in 7 of which the tuberculosis was the direct cause of death.

Between the ages of one and five years there were 11 lethal and 12 non-lethal cases; from six to fourteen years, 9 lethal and 7 non-lethal cases; from fifteen to eighteen years, 13 lethal and 11 non-lethal cases. The older the cases, the more likely one is to find a latent inactive tuberculosis; to illustrate this there were no latent inactive cases in children under one year, but between the ages of fifteen and eighteen no less than 9 of the 11 non-lethal cases were latent and inactive, while only two of these were latent and active.

Of 1262 autopsies upon adults, *i. e.*, those over eighteen years of age, there were but 113, *i. e.*, 9 per cent. free from tuberculosis, and Burkhart is inclined to believe that even these 113 had tuberculosis, but the focus was so small that it was overlooked, even though most carefully searched for.

The most frequent sites of tuberculosis were: lungs, 865; bronchial glands, 823; cervical glands, 368; secondary involvement of the intestines, 311; mesenteric glands, 312; liver, 220; kidneys, 201; larynx, 164; spleen, 156; other organs, with much less frequency.

Of 1262 adults, 466, *i. e.*, 37 per cent., died of tuberculosis; 165 of these were between the ages of eighteen and thirty; 124 between thirty-one and forty; 81 between forty-one and fifty; 54 between fifty-one and sixty; 31 between sixty-one and seventy, and 11 between seventy-one and eighty.

Of the 466 cases of lethal tuberculosis, pulmonary tuberculosis was the cause of death in 369, *i. e.*, 79 per cent. The age distribution of these 369 cases is as follows: eighteen to thirty years, 143 cases, 39 per cent.; thirty-one to forty years, 101 cases, 27 per cent.; forty-one to fifty years, 62 cases, 17 per cent.; fifty-one to sixty years, 39 cases, 11 per cent.; sixty-one to seventy years, 18 cases, 5 per cent.; seventy-one to eighty years, 6 cases, 1.5 per cent.

The frequency of latent but active tuberculosis varies at different ages, being least between the ages of fourteen and eighteen, and from this point rising slowly to 22 per cent. at ninety years.

The latent but inactive tuberculosis is least common between the ages of one and five, and from this point on rises steadily in frequency to 61 per cent. at ninety years.

While the frequency of a fatal ending to the tuberculosis during the first five years is but 15 per cent., the mortality rises rapidly to 50 per cent. at the age of fourteen, then falls between the ages of fourteen and eighteen to 33 per cent., and rises again to its maximum of 53 per cent. between the ages of eighteen and thirty. From this point it falls gradually and steadily through the advancing years.

PREVENTION OF TUBERCULOSIS. Robert Koch in the Nobel Lecture delivered in Stockholm, December 12, 1905, spoke of the present conditions of the struggle against tuberculosis. In accordance with the now generally accepted idea of the duality of the human and bovine tuberculosis, he says that bovine tuberculosis can be neglected, as causing only an inconspicuous part of tuberculosis in man.

Patients with closed tuberculous foci are not at all dangerous to others, and those with open tuberculosis are so only in the degree in which they neglect the care of their sputum and of their surroundings. The dirtier, the less complete the ventilation, and the more crowded the house in which a tuberculous patient lives, the greater the danger of the spread of the disease.

Koch believes fully in the notification of the authorities of all cases of tuberculosis, and that public institutions for examination of sputum should be maintained.

Institutions for those incurably ill of tuberculosis should be established, and the more such institutions there are, and the greater the proportion of those dying of tuberculosis confined in such hospitals, the less the number of cases of tuberculosis will become. The existence of such institutions is, Koch believes, a considerable factor in the lessened frequency of tuberculosis in Germany, England, and Sweden.

The establishment of hospitals for those in the incipient stages of tuberculosis should be pushed, but particularly does Koch urge the founding of dispensaries such as those planned by Calmette. The purpose of these is to visit the tuberculous patients in their own homes, to instruct them as to their manner of living, the care of the sputum, the arrangement of rooms and diets, to supply them with financial aid when required, and to see that the other members of the family, and particularly the children, are examined at intervals to detect at the earliest possible moment any fresh cases.

These institutions do not propose to take charge of the medical care of patients, that being left to the family practitioner, but plan to give to

the patients expert advice adaptable to the particular conditions in which each individual patient finds himself.

There is none better fitted than Koch to speak with force and directness upon any question connected with tuberculosis. His address contains much of interest besides the sentences quoted, but the suggestions which appear to me as the most important are these: first, the establishment of institutions for those dying of tuberculosis, and, second, the establishment of dispensaries similar to those first suggested by Calmette.

Not only should there be hospitals for the dying consumptives, but the authorities should have the power of forcing such patients into the institutions provided for them. It certainly is a cruel thing to take dying persons from their homes and friends to pass their last days among strangers, but it is far more important to protect the friends of the patients than to spare their feelings. The State has a right to protect itself, and should do so.

The Calmette dispensaries are being rapidly established in many large cities, and are doing a valuable educational work in the places where such work is most needed. One of the important results of this work is the early detection of fresh cases.

HUMAN AND BOVINE TUBERCULOSIS. It is now something over four years since Koch announced his conviction as to the duality of the tubercle bacillus, and while the idea was opposed for a time, it is now generally accepted, although Koch's further assertion that bovine tuberculosis did not affect man, or did so so rarely that it could be neglected, has not been proven.

Ravenel,¹ in a report upon a comparative study of various forms of tuberculosis, states that in the light of our present knowledge the following conclusions seem to be justified:

1. The division of the mammalian tubercle bacillus into two types, human and bovine, first proposed by Theobald Smith in 1898, has been amply confirmed. These types have cultural, morphological, and tinctorial characteristics by which they usually may be recognized. The chief point of difference, however, is found in the very much greater pathogenic power of the bovine type. Bovine bacilli are, however, met which have low pathogenic power.

2. No other species of mammal has been shown to harbor a variety of tubercle bacillus so constant in its characteristics as to justify its classification as a third type.

3. Other species suffering from tuberculosis derive their infection from man or cattle.

4. The human tubercle bacillus, as a rule, has a low pathogenic power for cattle, but cultures are not infrequently found which are virulent for the bovine race.

¹ American Medicine, 1905, 977.

5. The bovine tubercle bacillus has the power of invading the human body and producing lesions of tuberculosis.

6. We are at present unable to state the exact proportion of cases in which bovine tuberculosis is transmitted to man, but in view of the evidence at hand we must regard the disease in cattle as the source of a certain part of human tuberculosis, and any relaxation in our laws and precautions against bovine tuberculosis would be most unwise.

These conclusions by Ravenel put briefly the now current opinion as to the duality of the tubercle bacillus. This may now be accepted as an established fact, but it is well that Ravenel sounds a note of warning against relaxing the laws governing the inspection of the meat of tuberculous cattle. It is far better to be too careful rather than too thoughtful of possible immediate financial loss to the packers.

One of the most interesting and suggestive articles upon bovine and human tuberculosis appeared in *Arbeiten aus dem Kaiserlichen Gesundheitsamte*, 1906, Band xxiii, where von Dungern and Smidt have a report upon the comparative effects of bovine and human tubercle bacilli upon anthropoid apes. In all the animals ordinarily used for experimental purposes the bovine bacillus shows a higher pathogenic power than that derived from the human. It is therefore interesting to note that the gibbon is equally susceptible to both strains, and, owing to the near relationship which these animals bear to man, one might infer a similar susceptibility on the part of the human to both forms of bacilli.

Another interesting thing which was brought out in the animals used in feeding experiments is that both the animals fed with the bovine bacilli showed intestinal and mesenteric lesions, and these lesions were obviously the oldest lesions, while the two gibbons fed with human strains of bacilli showed no intestinal or mesenteric lesions, the primary lesions being in the lungs.

The number of experiments reported is not large, but they are so suggestive that they should be repeated.

AT WHAT PERIOD IN LIFE DOES INFECTION WITH TUBERCULOSIS OCCUR? Another aspect of the tuberculosis problem which has been repeatedly discussed is the period in life at which infection takes place, some holding that the majority require their infection late in life, shortly before the onset of clinical symptoms, while others claim that in most instances the infection takes place early in life, and lies latent for a longer or shorter period until some other factor comes in place and excites the infection to activity. Among the supporters of this latter idea is Marfan.

Marfan,¹ in an article read before the International Tuberculosis Congress in Paris, expresses his support of the idea that tuberculosis

¹ Wien. med. Blätter, 1906, 29, 51.

in the very great majority of cases is acquired during early childhood, and when it appears later in childhood or in adults the infection is not recent, but is a fresh breaking out of an infection which has been latent for years.

Believing this, he lays stress upon the importance of careful protection of children from tuberculosis during the first six years of life. The prophylaxis must be along two lines: first, the protection of the child from all sources of infection, and, second, the increase of the resistance of the child to infection.

Of all sources of infection the most important and commonest is the sputum of a tuberculous patient. The infective agent may enter the body through any mucous membrane or the skin, but according to Marfan's opinion the commonest infection atrium is the mucous membrane of the nose and pharynx and especially of the tonsils.

Children may take up the tubercle bacilli not alone from sprayed sputum, and more directly still by kissing, but also from dust on the objects with which they play.

The dust is carried by their hands directly from the plaything to the mouth. It is likely that this fact is the reason why tuberculosis is so much commoner in children after they begin to creep around than before.

The protection of children from the dangers of tuberculous sputum is far easier in a household where there are and have been no cases of tuberculosis. They must, under these circumstances, be guarded from visits and visitors. When, however, there is a case of tuberculosis in the family the danger to the child is great, and even the most intelligent care on the part of the family cannot protect the child completely. Under these circumstances one might seriously consider the propriety of taking the child from the family or removing the patient to some place away from the child.

An effort to furnish further support of this idea is shown in an article by Salge.

AGGLUTINATION TEST IN TUBERCULOSIS. Salge, of the Children's Clinic in the University of Berlin, reports some work upon the infection of children with tuberculosis during the earliest period of life, and applies the biological test of the agglutination of the tubercle bacilli by the serum. He contends that this is a sufficient test, and that the presence of such an agglutination proves the infection, though there may be no clinical evidence during life or pathological evidence after death of such infection. He also believes that his work is a confirmation of Behring's theory that the conditions for infection during the suckling age are especially favorable, and that such infection can remain latent for a long period, causing a manifest tuberculosis only late in life.

Salge studied the agglutination test in 80 children, 9 of whom were over one year of age. A positive reaction was obtained in 20; of these

20, 8 were over one year. Of the 60 children giving negative reactions 40 were under three months, and were examined as they entered the hospital. The children over one year were examined because a tuberculous infection was suspected.

The value of this work rests entirely upon the value of the agglutination reaction, something still open to discussion. The agglutination of the tubercle bacillus as a diagnostic aid has been mentioned in these articles before, and the general impression given that it remains to be shown that the test is of diagnostic value.

In an article by Ravenel and Landis, quoted immediately below, is one conclusion bearing on this point, to the effect that the agglutination test is not available for diagnostic purposes.

Ravenel and Landis¹ have been studying agglutination in tuberculosis for the purpose of determining whether the reaction was of any prognostic significance, and also to ascertain whether the resistance of the individual was increased by the hygienic and dietetic means now employed.

It is assumed that the higher the agglutinating power which the serum has over the tubercle bacillus, the greater is the degree of immunization. This assumption is strengthened by the fact that of 59 advanced cases of tuberculosis 30 caused agglutination in dilution of 1 to 10, 18 in 1 to 15, 1 in 1 to 25, and 1 in 1 to 30; while of 19 incipient cases two agglutinated in dilutions of 1 to 10 to 15; 6 agglutinated in 1 to 20, 9 in 1 to 25, and 1 in 1 to 30.

The diazo reaction was also tested in 46 of the 59 advanced cases, and was present in but 13, but was never present when the agglutination was above 1 to 15. The conclusions drawn are that:

1. The agglutination test is not available for diagnostic purposes.
2. The more advanced the disease, the lower the agglutinating power.
3. A low agglutination is of unfavorable prognostic significance.
4. Cases under favorable conditions, as at a sanatorium, have the agglutinating power distinctly increased.

TUBERCULIN. Beginning in the June number of the *Centralblatt f. die Grenzgebiete der Medizin und Chirurgie*, Weiss has a very complete review of the literature of the old tuberculin as a means of diagnosis and treatment. The article is valuable because it assembles the very extensive literature, and a few points upon the diagnostic use of this agent have been selected for notice.

In the first place the majority of authors insist that the tuberculin should be given in the manner suggested by Koch, which is as follows: After careful noting of the temperature for one or, better, two days, so that one can be certain that the patient has no elevation of temperature, from 0.1 to 1 mg. of tuberculin is injected.

¹ Medical News, 1905, 1070.

In weak patients not more than 0.1 mg. while those who are strong, and in whom only very slight tuberculous changes can be present, doses up to 1 mg. may be used. If no reaction follows, double the dose may be given after the passage of forty-eight hours. If, however, even 0.5° F. of temperature results, the second dose should not be larger than the first. It is found that the patients often react strongly to a second dose, although not at all to the first.

The symptoms of reaction begin to appear in from three to four hours, and consist of headache, malaise, pains in the limbs, cough, moderate dyspnea, and in about five hours a chill, followed by temperature. The reaction usually lasts about twelve hours.

The intensity of the reaction and of the various symptoms comprising it vary greatly in the different cases. The general, influenza-like symptoms are constant, but the elevation of the temperature sometimes fails to appear.

Local changes in the tuberculous lesion vary in intensity, being best marked in skin tuberculosis. Numerous authors report finding physical signs over the lungs after the injection, which were not present before. This, however, happens in only a relatively small proportion of the cases.

The great bulk of the authors quoted are convinced that we have in tuberculin a highly certain and safe means of recognizing cases of tuberculosis during that period in which one can only suspect the presence of a tuberculous infection. It is useful in those cases which appear complaining of loss of strength, energy, and weight without definite reasons for such loss. The tuberculin in such cases aids greatly, and the more so because incipient cases of tuberculosis appear to react more certainly and easily than those in whom the process has reached a considerable development.

While there are a few cases of apparent injury following the use of tuberculin, they are very few when compared with the thousands in whom this diagnostic aid has been employed.

Be sure the patient is free from fever before using it. Use small doses and increase carefully, if no reaction follows the smaller doses. A temperature of 1° F. constitutes a reaction. There is no point in using the tuberculin as a means of diagnosis, if the condition is certain without it.

One may add to this brief statement the fact that those who have used tuberculin most as an aid to diagnosis are the ones who are most certain of its value and safety.

BLOOD PRESSURE IN TUBERCULOSIS. Burckhardt¹ in later work confirms his conclusions of some years ago to the effect that as a pulmonary tuberculosis advances the blood pressure falls and the pulse rate rises. Afebrile cases, which are not advancing, show a blood

¹ Zeitschrift f. Tuberculose, 1906, 459.

pressure which corresponds to that of one in health. The pulse rate is about normal. In cases which are progressive, even though free from temperature, the blood pressure falls and the pulse rate goes up.

The changes are sometimes of assistance in the diagnosis; particularly is this true of the increase in pulse rate. A very slight elevation in temperature causes a marked increase in pulse rate, an increase far beyond that which usually occurs in other forms of infection.

Such points as these do not separately count for much, or aid one much in reaching a conclusion, but the presence of many little signs will lead one as certainly to a diagnosis as does the presence of a few marked and positive findings.

THE DIAZO REACTION IN TUBERCULOSIS. Several years ago attention was drawn in *PROGRESSIVE MEDICINE* to the prognostic significance of the diazo reaction in tuberculosis. Since that time only little has appeared upon the subject, but Holmgren¹ recently published an article in which he confirms the conclusions indicated then. His conclusions are that this reaction occurs almost exclusively in cases in the third stage or the latter part of the second stage of the disease, and that while the reaction is sometimes absent in these cases for short periods, it will invariably be obtained if searched for persistently. The more acute in character the infection, the shorter the period during which the reaction can be obtained. The more intense the reaction, the earlier death will occur.

When the diazo reaction is well marked, one can with great probability say that life will not continue more than six months, and that the average for such cases is but two months.

If the reaction is distinct, but not strong, it is possible that life may continue a year and a half, but that it probably will not last more than six months.

Holmgren also concludes that one is warranted in drawing these conclusions even though a distinctly positive reaction is obtained but once. When one recalls the very wide diversity of conditions in which it is possible to obtain the diazo reaction, he will be unwilling to adopt as broad a conclusion as this.

One other important conclusion may be pointed out, namely, that if the diazo reaction does not appear at all before the death of an individual upon whom a diagnosis of tuberculosis has been made, doubt must be thrown upon the correctness of the diagnosis. He mentions a case in which this occurred, and the autopsy showed numerous pyemic abscesses, but no tuberculosis.

TREATMENT OF TUBERCULOSIS. There is very little to be said upon the subject of the treatment of this disease. Attention is at present concentrated upon its prevention, and upon spreading information

¹ Zeitschrift f. Tuberculose, 1906, 30.

among the laymen of the great importance of proper hygiene and food. There have, of course been many articles upon treatment, but the one for which we have all been waiting, one by Behring, has not yet appeared.

Among the various means of specific therapeutics which have attracted attention during the last few years is the *serum of Marmorek*.

Marmorek¹ reviews the articles which have so far appeared upon the use of his antituberculous serum. Reports upon 350 cases have so far appeared, but in many the cases were not of the sort which Marmorek wished to see selected. It was his desire that severe but not hopeless cases should be chosen. He wished also that it should not be used in the mild cases, which promised recovery under the usual methods of treatment.

Most of the cases were pulmonary, but some were surgical tuberculosis. In the latter group the favorable results reached almost 80 per cent.

The impression Marmorek gives is that the results have been good, but the complete statistics are not given, although the results in 230 cases are quoted and are decidedly favorable.

One point which is brought out is almost too good to be true, namely, that it is not necessary to change the manner of living followed by the patients; they continue at their work, even when it is hard work, without interruption.

Marmorek advises the use of the serum every other day until 10 to 12 injections are given, and then follows a pause of three to four weeks. In this way the local infiltration, redness, and swelling, so common if too frequent injections are given, are avoided.

During the past two years more than 40,000 injections have been given, showing the safety of its use.

Typhoid Fever. Some of the aspects of this disease which last year were extensively discussed have been neglected entirely, while the reverse is true of others. Many old phases have been discussed. Some old facts have been confirmed and strengthened, but only very little that can be called new has been added.

STATISTICS ON TYPHOID FEVER. Skutezky² has carefully reviewed the cases of typhoid fever treated in the v. Jaksch clinic from 1889 to 1903. Such statistical reviews are not very interesting reading, but old facts are recalled and more firmly fixed in the mind by reports of long series of cases observed by the same man over a long period of years. The report covers 793 cases.

The variability in the severity of this disease is well illustrated by this series, the mortality ranging from 3.5 per cent. to 25 per cent., with an average mortality of 12.5 per cent. Another observation confirmed by the series is the age distribution of the disease; nearly 50 per cent. of

¹ Medizinische Klinik, 1906, 58.

² Zeitschrift f. Heilkunde, 1906, 27, ii, 14.

the cases were between the ages of twenty and thirty, and 75 per cent. of them between the ages of fifteen and thirty.

The second part of the article is more important, and considers the numerous complications. It will not be possible here to quote fully, there being space merely to point out some things which seem of interest or importance. Thus among the *cutaneous complications* it is worth while to note that there are only 4 cases of roseola hæmorrhagica, *i. e.*, 0.5 per cent. Less important is the statement that miliaria were seen in but 1.89 per cent., a figure which strikes me as being very low. Herpes labialis was noted but six times. Decubitus is reported forty-one times, and in commenting upon this high figure Skutezky says that it is largely due to the fact that previous to 1899 the bath treatment could be employed only very incompletely. Since that date it has been used systematically, and there have been but 5 bed-sores in 211 cases.

The *circulatory apparatus* furnished only a relatively small number of instances of complications, listed as follows:

Myodegeneration of heart, 6 cases, *i. e.*, 0.75 per cent. of the total number, and of these 5, died; pericarditis, 1 case, ending in recovery; endocarditis, 15 cases, *i. e.*, 1.89 per cent., of whom 6 died; embolism, 3 cases, all ending fatally; thrombosis, 19 cases, *i. e.*, 2.39 per cent., only 2 ending fatally.

The thing which emphasizes itself most strongly about this statement is the rarity of the myocarditis. Either the v. Jaksch clinic demands too much before making a diagnosis of myocarditis, or other clinics ask too little.

Among the *respiratory complications* bronchitis is noted in 38 per cent. of the cases; lobular pneumonia in 5.5 per cent. of the total cases, causing death in 50 per cent.; lobar pneumonia in 25 cases, *i. e.*, 3.1 per cent.; pleuritis exudativa in 7 cases.

Intestinal hemorrhages took place in 38 cases and 15 of these died, giving a mortality of 40 per cent. among the cases having enterorrhagia.

Perforation occurred in 12 cases, 1.5 per cent., and all ended fatally.

Jaundice was seen 7 times.

Cholecystitis appeared in but 3 cases.

Relapses occurred in 48 cases.

Acute nephritis, either hemorrhagic or not, was noted in 26 cases, of which 10 died.

Febrile albuminuria was found in 98 cases, *i. e.*, 12.3 per cent. This is a very small figure.

The *Widal reaction* was tested in 300 cases and was negative in 62 cases. Splenic puncture was employed in 46 cases and the bacilli were missed in but 4 of them. The *typhoid bacilli* were found in 60 per cent. of the stools examined, 82 per cent. of the urines, 58 per cent. of

the roseola, and 94.4 per cent. of the spleen punctures. The latter is regarded as the most positive of the means of quick diagnosis, and is said to have been found free from danger.

Curiously enough, no mention is made of the blood culture, a method far safer and simpler than the splenic puncture, and, when properly employed, equally reliable.

Treatment. From 1889 to 1899 various methods and drugs were used. Antifebrin, antipyrin, lactophenin, pyramidon, quinine, chloroform, iodine, each had its turn. The baths were not given systematically, and throughout this period alcohol was used very freely. Since 1899, when the new clinic was opened, the baths have been given generally. The antipyretics have been discontinued, except for an occasional dose lactophenin. Alcohol is given only under exceptional circumstances.

The result of this has been a gradual decrease in the mortality, with less marked variations in the death rate from year to year. The complications have become less frequent and less severe.

BLOOD CULTURES IN TYPHOID FEVER. I have repeatedly referred to the high value of the blood culture as an aid to diagnosis in many of the infective processes. This method continues to be used, and the more it is employed and the more completely the technique is developed, the higher the percentage of successful cases becomes. During the year there have been two articles, one by Duffy and one by Hirsh, giving a very high percentage of positive results. We shall refer also to a method suggested by Pöppelmann of showing the typhoid bacilli in blood smears, but would say in passing that it sounds too good to be true.

Duffy¹ has made blood cultures in a series of 88 cases of typhoid, and reports that he found the typhoid bacilli in all of 56 cases in which the temperature was above 102°; while they were found in but 10 of 23 cases in which the temperature was 100° or 101°. He believes, however, that it is not so much a question of the degree of temperature as of the period of the disease in which the examination is made. The higher temperature in all the above cases corresponded with the second or third week of the disease.

Coleman and Buxton, in the first volume of the report from Bellevue and the allied hospitals of New York, report that they have studied the bacteriology of the blood in 60 cases of typhoid, and found the bacilli in 34. They have collected 544 cases from the literature. Of the total 604 cases the bacilli were found in 453, *i. e.*, 75 per cent. It is likely that this percentage is much below the proper figure, for the later reports, like that by Duffy, show that the bacilli are practically uniformly present in the first three weeks of the disease.

Hirsh² also has a report upon the bacteriology of the blood in typhoid

¹ Jour. Amer. Med. Assoc., 1905, 1558.

² Ibid., 1906, 46, 1922.

fever. He has studied 100 cases in which he was able to demonstrate the bacilli in the circulating blood seventy-eight times. His results are as follows: 16 cases were examined during the first week, with 12 positive; 50 during the second week, with 43 positive; 24 during the third week, with 19 positive; 7 during the fourth week, with 1 positive. The bacilli were found four times in 4 cases of relapse.

Hirsh concludes that the bacilli are present in the blood in all cases at some time in the course of the disease, but that they usually disappear by the end of the third week.

It is unquestionably true that most of the modern aids to the diagnosis of typhoid, which mean so much and have removed so many of the difficulties which formerly stood in the way of the early diagnosis of this disease, are not available to the physician who is remote from laboratory facilities. Many of them, too, are rather late in appearing. The demonstration of the bacilli in the blood is one of the earliest signs of the disease, and constitutes proof of its existence. So far the demonstration of the bacilli has been possible only by culture methods; it is therefore interesting to note that Pöppelmann¹ reports the demonstration of the bacilli in *blood smears*. The smears are made in the ordinary manner and then stained by the May-Grünwald method. Pöppelmann claims to have gotten much better results by this method of staining than by any other. The method is worthy of trial, for it requires no apparatus other than a good microscope.

OCCULT BLOOD IN TYPHOID FEVER. It has already been pointed out in these articles that the detection of occult blood in the stools of typhoid-fever patients is a matter of importance, serving often as a warning of severe hemorrhages, and as an additional evidence of the severity of the process.

Romani² reports his results of the examination of the feces of 50 cases of typhoid fever, using both the guaiac and the aloin tests, of which he prefers the guaiac as being the more delicate. Blood was found in 14 cases, of which 7 were severe, 3 moderately severe, and 4 mild. Of the 34 cases in which no blood was obtained, 11 were severe, 15 moderately so, and 8 mild. In some cases traces of occult blood were found three or four days before gross evidences of hemorrhage were obtained. The use of a mild purgative was likely to be followed by traces of blood in the stools.

TYPHOID AGGLUTININS IN MOTHER AND FETUS. Stäubli³ considers an interesting question in his article upon behavior of typhoid agglutinins in mother and fetus. There is experimental evidence to show that agglutinins pass into the fetal blood from the mother, and Stäubli's experiments upon animals confirm this. He was glad, however, to

¹ Deut. med. Woch., 1906, 32, 947.

² Rif. Med., February, 1906.

³ Münch. med. Woch., 1906, 798.

find an opportunity to confirm this clinically in a woman who entered the hospital for delivery at term. During the third month of the pregnancy she had passed through a severe attack of typhoid fever. After the time of delivery, her blood gave an agglutination of the typhoid bacillus in a dilution 1 to 400; the blood of the child in 1 to 25.

From this Stäubli infers that the child had received its agglutinins from the mother.

A personal observation last year leads me to the opposite conclusion. The case was that of a mother who aborted in the last week of a moderately severe typhoid. The blood and organs of the fetus gave abundant and pure growths of the typhoid bacillus, but its blood had no agglutinating power. The maternal blood had, however, a high agglutinating power. The inference we drew from this was that the fetus had become infected with the typhoid bacillus so shortly before its death and expulsion that there had been no time for it to form agglutinins, and that while the mother had had the disease for some weeks, and had produced an abundant supply of agglutinins, none of these had passed over to the fetus.

TYPHOID FEVER IN CHILDREN. Pater and Halbron¹ have published an interesting article upon typhoid fever in children based upon 63 cases, in which they point out certain differences from the currently accepted clinical picture of this disease in children. Thus in many places typhoid is said to begin suddenly in children, while among their cases there were but 3 which did not begin with a period of indefinite symptoms such as initiate typhoid in the adult. Vomiting was very frequently noted, as was also abdominal pain. This was rarely severe, but was frequent and not confined to any one portion of the abdomen. Tenderness was present in about two-thirds of the cases.

Diarrhea was common in some cases, being present from the onset of the illness, while in others it was preceded or followed by constipation. A small number of the cases were constipated throughout the entire course of the disease.

Rose spots were found in 54 of the 63 cases. They were oftenest noted on the seventh day, but once were found as early as the fifth day. The abundance of the eruption varied greatly in the different cases.

Marfan and others have stated that enlargement of the spleen does not occur in more than one-half of the cases of typhoid fever in children, but these authors found it in 52 of their cases. The enlargement is usually moderate, and in children, as in adults, should be determined by palpation and not by percussion. The splenic tumor is said to appear from the seventh to the twentieth day, but Pater and Halbron found it once as early as the third day of the disease, and found it seven times earlier than the seventh day.

¹ Archives générales de médecine, 1906, 193.

The pulse is usually dicrotic. The temperature appears to reach its maximum more quickly than it does in adults. Many of the cases entered the hospital upon the third or fourth day of their illness, and already presented the maximum of their fever. One case developed in the ward and on the third day reached the highest level of temperature.

Meningeal symptoms were exceptional; Kernig's sign was found but three times in 62 cases.

Cardiac depression was noted with a certain degree of frequency. A tachycardia reaching 140 was noted three times, and in these cases there was some tendency on the part of the heart to show a fetal rhythm. In 5 cases the pulse reached 160 to 164, death occurring in all. Myocarditis was found twice and acute endocarditis once at autopsy.

In reviewing this report one sees no particular variation from the clinical picture presented by this same disease in adults, and such variations as may be noted can easily be accounted for by variations in the character of the epidemic.

No one who has seen much typhoid fever over many years expects the cases of one year to exactly resemble those of any other. The differences, however, from year to year concern the less important symptoms. The intensity of the gastrointestinal symptoms, the frequency of vomiting and diarrhea, the percentage of cases showing severe headache or nose-bleed, the severity of the accompanying bronchitis, and other symptoms vary from year to year over a wide range, but the cardinal phenomena of the disease are relatively constant. There is not much variation to be noted in the relative bradycardia of the earlier weeks of the disease, the Widal reaction, the leukopenia, and other symptoms more or less peculiar to the disease.

ROSSO'S URINE REACTION IN TYPHOID FEVER. In 1905 Rosso reported a color reaction in the urine of typhoid patients which he regarded as of great diagnostic and prognostic significance. Four drops of a 1 to 1000 solution of methylene blue added to four or five cubic centimeters of the urine gave an emerald-green color.

Cousin and Costa¹ have made a study of this reaction and conclude that it is of no value. They found that if they used dark-colored urine they obtained a green color in 90 per cent. of the tests, while if they used a pale urine they obtained it in but 12 per cent. If they made a urine dark by concentration, they got a green color; if they made it pale by dilution they did not obtain it.

HYPERPYREXIA IN TYPHOID FEVER. Cases of hyperpyrexia in the course of all of the acute infectious diseases are occasionally noted, but it is not often that one records, as Mollweide² does, a typhoid in which

¹ La presse médicale, 1906, 162.

² Zeitschrift f. klinische Medizin, 1906, 59, 187.

the temperature rose several times to 109.4°. This is, I believe, the highest point ever recorded for typhoid fever, although higher temperatures in heat stroke are not so uncommon.

HEMORRHAGIC DIATHESIS IN TYPHOID FEVER. Meyer and Neumann¹ had the unusual experience of seeing 3 instances of a hemorrhagic diathesis in 12 cases of typhoid fever in the Leyden clinic.

There are many of the acute infections which are frequently accompanied by this diathesis, but certain others, notably pneumonia and typhoid fever, rarely show it. It is therefore interesting to note 3 cases in a single clinic in one summer.

In all diseases showing this complication the prognosis is bad, and all previous experience with cases of hemorrhagic diathesis in typhoid lead to the same prognosis, yet all the cases included in this report recovered.

YELLOWISH DISCOLORATION OF THE PALMS OF THE HANDS IN TYPHOID. Among the less important signs of typhoid fever one may mention a short article by Regis² in regard to the yellowish discoloration of the palms as first described by Philipowicz in 1903. Regis, following a number of Italian observers, believes that this sign, while not peculiar to typhoid fever, is highly suggestive, and he reports a case in which he was able to make the correct diagnosis early, mainly by means of this sign.

I may say that in 1903, shortly after the article by Philipowicz, I paid particular attention to this sign, but very shortly ceased to do so because it appeared to be of no consequence. The condition and color of the palms seemed to be more influenced by the occupation of the patient than by the disease.

ABDOMINAL REFLEX IN TYPHOID FEVER. Another rather unimportant symptom of typhoid fever to which renewed attention has been drawn is the loss of the abdominal reflex. Rolleston³ states the loss of this reflex in persons under fifty occurs only in certain nervous diseases and in acute abdominal conditions, notably typhoid and appendicitis. Hence the inference that in a patient under fifty suffering from a continued fever, and showing no abdominal reflex, the disease is probably typhoid fever.

Rolleston has studied the reflex in 45 cases of typhoid fever, and found it affected in 43 of them, being entirely lost in 31 and impaired in 11.

In typhoid fever the infraumbilical reflex is the first to disappear and the last to reappear. The supraumbilical response may be active throughout the disease, or, more commonly, responds slightly and becomes rapidly exhausted by a few stimuli.

¹ Zeitschrift f. klinische Medizin.

² Medical Press and Circular, 1906, 82, 6.

³ Brain, 1906, 29, 99.

Reappearance of the reflex or an increase in its activity indicates improvement, while persistent absence, in spite of lysis, suggests that a relapse is imminent.

TYPHOID SPINE. The *Centralblatt f. die Grenzgebiete der Medizin und Chirurgie* (1905, 8, 645) has an elaborate article upon typhoid spine in which the entire literature of this subject is carefully reviewed. The article is far too detailed to admit of anything more than mere reference, but anyone who is interested will find there all there is to be found anywhere.

THE MESENTERIC GLANDS IN TYPHOID FEVER. Attention has been drawn in earlier articles of this series to the fact that changes in the mesenteric glands may cause serious symptoms and complications in the course of typhoid fever.

Rowland¹ reports 2 instances in which sudden abdominal pain, with muscular rigidity, rapid pulse, and leukocytosis, occurring in the course of typhoid fever, led to a probable diagnosis of perforation. Operation failed to show perforation, but in each case the mesenteric glands were found to be greatly swollen. Both cases recovered.

Rowland suggests that some of the cases of so-called spontaneous recovery from typhoid perforations are of this same nature.

ANTITYPHOID SERUM. In 1904 reference was made to a report of Chantemesse² upon his experience with an antityphoid serum. Since then he has continued to use this same serum and has contrasted the results in treating 712 cases over a period of five years with those obtained in treating 3595 cases in the various other hospitals of Paris over the same period. His mortality was 3.7 per cent., while among the cases treated by hydrotherapy and other routine means the mortality was 17.3 per cent. This difference in results cannot be accounted for by differences in the character of epidemic, nor can his favorable results be laid to good fortune in a short series of cases.

The beneficial effects of the serum are shown not only by the reduction of the mortality to one-fifth of that obtained by other methods, but by the prompt fall in temperature, by the improvement in the pulse, by the increase in the amount of urine, by the shortening of the course of the disease, and by the smaller number of complications.

There were 9 instances of perforation among the 712 cases, all among cases entering later in their illness. Chantemesse has never seen death result in a patient who received the serum during the first week of the disease.

Whooping-cough. David J. Davis³ has been studying the question of the bacteriology of whooping-cough and reports finding an influenza-like bacillus in 56 of 61 cases examined. This organism he believes

¹ Jour. Amer. Med. Assoc., 1906, 46, 507.

² La presse médicale, February 1906.

³ Journal of Infectious Diseases, 1906, 3, 1.

to be the same one described by Spengler, Jochmann, and others. He, however, is still in doubt as to whether this is the causal bacterium of whooping-cough or not. Organisms which have not been differentiated from this bacillus occur in a variety of throat affections and occasionally in normal throats alone; its pathogenicity for animals is low; when associated with other organisms, this property is decidedly increased.

Yellow Fever. The 1906 volume of the *Annals of the Pasteur Institute* in Paris contains the elaborate report of the French Commission sent to Rio Janeiro to study yellow fever. Some of the conclusions which seem most important and of general interest are quoted. The work of Reed, Carrol, and Agramonte is confirmed, and the French Commission is convinced that yellow fever is transferred by the *Stegomyia fasciata*, and probably in this way only.

In order to be able to do this the *stegomyia* must bite the patient during the first three days of the disease. Then after a minimum interval of twelve days, passed in favorable conditions of temperature, it has the power to confer the infection.

Under certain conditions the infection can be transmitted by the female to its young. There is experimental evidence of such transference to the first generation, but so far transmission to the second generation has not been observed.

A bite during the incubation period of yellow fever does not infect the mosquito.

While experimentally the mosquito will bite at any hour of the day, at liberty it bites only during the night.

It is probable that the *stegomyia* is the only one among the existing species of mosquitoes which furnishes the necessary conditions for the development of the virus of yellow fever. Twelve days must elapse after the sucking of infected blood, before the mosquito can confer the disease. This condition is not furnished by the majority of the culicids, for most of them lay their eggs within the first eight days and then die. The *Stegomyia fasciata*, however, does not die after the first laying of eggs, but may lay even to seven times. It lives on an average from twenty to thirty days.

Yellow fever is due to a living virus present in the blood during the first three days of the disease. The organism is very small, for it can pass through the Chamberland filter.

It is also easily destroyed by heating for five minutes at 55°. Serum containing it loses its virulence at the end of forty-eight hours at a temperature between 24° and 30° C.

The virus cannot be cultivated by any means yet known.

The incubation period of yellow fever is from four to six days, but it may be prolonged to thirteen. One attack confers an immunity which is usually permanent. When a second attack occurs, it is usually mild.

There is no racial immunity to the disease.

The human is susceptible to the infection at all ages, but in young children the disease is so mild as to often escape recognition.

Otto and Neumann¹ have also a careful report of work done upon yellow fever in Brazil.

¹ Zeitschrift f. Hygiene, 1905, 51, 357.

THE DISEASES OF CHILDREN:

BY FLOYD M. CRANDALL, M.D.

WHILE nothing startling or radically different from past teaching has been presented in pediatrics during the past year, it may be said that substantial progress has been made. We do not always recognize events as epoch-making until several years after they have occurred. It would seem, however, that nothing that may be called epoch-making has recently occurred in pediatrics. In an address upon the pediatric outlook,¹ Hollopeter refers to the great progress that has been made in the specialty of pediatrics. But a few decades ago it was hopelessly entangled and practically lost in the chair of obstetrics in every medical college. A special chair or clinic on diseases of children was unknown. In fact, the man is still living who held the first clinic in this country on children's diseases. Now almost every medical college has a full chair upon pediatrics and the teaching of the diseases of children is an important feature of the curriculum. The principle is generally recognized that pediatrics has no relation whatever either with obstetrics or gynecology, but is allied rather to general medicine.

In reviewing the work that has already been done and in considering the problems that present themselves for solution, Hollopeter believes that one of the most important is the prosecution of a campaign of education for maternity. A troublesome obstacle that the pediatricist encounters today is the general ignorance and helplessness of the young mother. She may be skilled in letters, arts, and sciences as a college graduate, but may know little or nothing regarding the essential hygiene of early life. Every practising physician realizes that the most highly educated women do not always make the most competent mothers. It must be admitted that the college furnishes them with little or nothing to prepare them for the most difficult portions of their life work. A highly educated mother has recently, on several occasions, explained to me her errors by the remark that she was a college girl. A campaign of education for preparation for motherhood is certainly important, if continued advancement is to be made in the saving of child life.

In speaking of the opportunities of the pediatric practitioner, Rotch² refers particularly to the need of more correct therapeutic measures in treating the diseases of children. There is a strong tendency on the

¹ Jour. Amer. Med. Assoc., August 11, 1906.

² Ibid., September 8, 1906.

part of the general practitioner to exaggerate the importance of many symptoms and to neglect the study of natural processes. Certain symptoms in the adult indicate danger and require active treatment, but in the child they may be simple and harmless manifestations of an over-excited nervous system. This naturally leads to much overtreatment and is an error to be combated by a better understanding of natural processes in the infant and child. Rotch also refers to the vast mass of pediatric literature of the last fifty years and laments that so much of it is unreliable and, therefore, of little value. While this is certainly true of pediatrics, the criticism cannot, unfortunately, be confined to that department of medicine.

The Incidence of Disease in Children. A study of the relative frequency of disease in any class of individuals is an important preliminary to preventive measures and frequently presents evidence of the greatest value. Such a study has been made by Van Wart and Mera¹ upon 1000 consecutive cases in the Clinic for Children at Bellevue Hospital. In such a clinic, the relative frequency of various diseases is fairly well shown for the poorer portions of the city. The cases reported were purely medical and border-line cases between medicine and surgery. Fully 100 diseased conditions were seen, but only in three did the relative number rise above 10 per cent., viz., adenoids, bronchitis, and gastrointestinal affections. The 14 per cent. recorded for *adenoids* by no means represents all the cases in which that condition was present, but simply those in which the adenoids manifested distinct symptoms and warranted treatment.

Acute bronchitis furnished 12.4 per cent.; chronic bronchitis 1.7 per cent.; thus showing about one case of chronic for seven of acute inflammation of the bronchi. Of pneumonia there was 1.2 per cent., or a ratio of one case of pneumonia to ten of acute bronchitis. One-third were lobar and two-thirds bronchopneumonia. The gastrointestinal cases amounted to a little over 10 per cent., not including feeding cases.

When we consider that the total furnished by adenoids, adenitis (nearly all cervical), pharyngitis, and tonsillar affections, not including diphtheria, was 245, we appreciate how important is this territory, rich in lymphoid tissue, as the site for inflammatory processes. We now believe it to be the portal of entrance of many serious general infections. The figure for endocarditis is significant also when it is seen that over 1 per cent. of these children were found to be affected with organic cardiac disease. Otitis media was another disease met with great frequency, the figure being 1.2 per cent. No doubt these figures are far short of the truth, as many parents consider running of the ears too trivial to require medical attention.

Of infectious diseases, pertussis was the leader, with 36 cases in the

¹ Archives of Pediatrics, July, 1906.

1000. Acute inflammatory rheumatism, occurring mostly in the older children gave 1.1 per cent., rickets nearly 2 per cent., tuberculosis of various structures nearly 1.4 per cent. As a sad reminder that the sins of the fathers are visited on the children, hereditary syphilis loomed large with 1.4 per cent. and 1 per cent. of innocent babes and children were infected with the gonococcus, as a vulvovaginitis.

Infantile Mortality. This subject has been largely considered of late by the English writers. Three factors are especially noted by Divine¹ as potent in increasing the mortality rate in infants. (1) The industrial employment of women. This conduces to the neglect of infants, as no woman can work hard and properly nourish her child. (2) Overcrowding frequently sums up the factors of poverty, intemperance, and crime. It is in the overcrowded sections that the most dangerous occupations are carried on. (3) High birth rate. The higher the birth rate, the higher the infantile mortality. The above factors are mutually related to the infantile mortality; where one factor is low, another may be high, and according to the degree with which these operate the infantile mortality is determined. The relation of infantile mortality to the employment of married women in factories is the subject of a carefully written article by G. Reid.² It appears that mortality among infants is invariably above the normal in communities where women form a considerable proportion of the working population. In the northern towns of Staffordshire, where women universally work, in every 1000 births there are 15 abnormalities and 9.4 stillbirths. In the southern towns, where few women work, only 6 abnormalities and 3.2 stillbirths occur among each 1000 births. At present the English law forbids mothers working for one month after their confinement. This should be made three months in order that they may be induced to nurse their children.

It has been held by H. Koeppe that the infants who survive are not necessarily adapted for the struggle for existence. Many of the diseases which affect infants, such as the infectious diarrheas, kill the strong, and the weak children who survive the summer are not necessarily the fittest. This principle is confirmed by certain statistics based upon recent observations of Koeppe.³ Many of the causes which act to produce a high mortality during the first year are also operative during succeeding years. These new statistics seem to show that it is not necessarily the unfit who succumb during the first months of life.

A very fatal disease in children of nervous type is reported by Dr. Castro⁴ as being prevalent in the Philippines. It has some of the characteristics of meningitis, but lacks some of its most characteristic manifestations. Dr. Castro is in doubt as to its nature.

¹ Lancet, July 21, 1906.

² Ibid., August 13, 1906.

³ Münch. med. Woch., liii, No. 5.

⁴ Amer. Med., October, 1906.

Prevention in Children of Diseases Occurring in the Adult. The importance of detecting certain affections in their early stages and curing them before they become incurable, is pointed out by Batta.¹ *Scoliosis*, for instance, is seldom diagnosed until the deformity is well-established. *Spasms* in a child are often attributed to worms, not to latent epilepsy which they often are. *Bronchial asthma*, in the adult, may have been heralded by slight asthmatic disturbances in the child to which no one paid attention. *Umbilical hernia* in the adult is often the result of umbilical hernia in the child, which although healing spontaneously, leaves a predisposition for later recurrence. The same might be said of *inguinal hernia*. Preventive medicine must be based on accurate observation to be effectual. Its field is particularly encouraging in children, as they are in the formative period, but it requires a constantly vigilant eye and a skilful hand.

The Diathetic Child. The history of medicine, as far back as we can trace it, shows that in all times recognition has been made of the fact that under apparently similar conditions, one person becomes ill while another remains in apparently normal condition. We are forced to the conclusion that certain factors exist in every individual, which are not common to all members of society. These special factors are the subject of a paper by Legrand Kerr.² Recognition of a diathesis presupposes that the appropriate measures will be pursued to prevent the disease, which may be dependent upon such diathesis. Here the old-fashioned family physician held a position which was nearly ideal. Occupying a position of peculiar intimacy and confidence with every member of the family, he was able not alone to cure their ills, but by timely advice and warning, to prevent the occurrence of diseases, the tendencies to which he was able to foresee. The more this prerogative of his was curtailed, the more was attention to diathesis neglected.

A diathesis, according to Kerr, is a congenital condition of the system which renders it particularly liable to certain diseases: First and foremost is the tuberculous; second, the uric acid; third, the hemorrhagic; fourth, the obese. He does not recognize the scrofulous diathesis, and if he did would never make it synonymous with the tuberculous. With appropriate treatment a scrofulous tendency is rapidly and easily eradicated, if taken early, and any alarm as to the occurrence of tuberculosis disappears with its cure. This is not true of the *tuberculous diathesis*. The tuberculous diathesis plays as important a part in the genesis of tuberculosis as does the exciting germ itself. Independent of direct infection, there can be no development of the disease. In the presence of the diathesis, it requires but a slight exposure to start the process. Under exactly similar conditions the diathetic child will succumb,

¹ Gazzetta degli Ospedali, xxvii, No. 6; Jour. Amer. Med. Assoc., July 14, 1906.

² Archives of Pediatrics, April, 1906.

while the non-diathetic will probably escape. The fight then properly comes not against the disease only, but against the source of infection and also the diathesis.

The early recognition of the *uric acid diathesis* has for its aim the prevention of cardiovascular changes. Long before these are liable to occur, the diathesis gives evidence of its existence in a multiplicity of symptoms. The suspicion once aroused that any symptom may be due to this particular diathesis should at once result in examination and re-examination of the urine, and also of the heart, for the detection of any so-called functional disturbance. Of no part of the body is it more true than of the heart, that continued perversion of function leads to early structural changes. One of the early evidences of uric acid diathesis is functional perversion.

The *hemorrhagic diathesis* is easily recognizable by the marked influence of heredity. The exact nature of this condition is still unknown. The factor of inheritance is the point to be emphasized.

There are two kinds of *obesity*: one which may be termed mere fatness, the other which is diathetic and which is dependent upon the failure of perfect oxidation. This obese diathesis may be likened to diabetes and the accumulated fat to sugar. In the obese diathesis, deficient oxidation leads to the deposit of fat in the tissues.

The Weight of Infants and Children. Weight in the first two weeks of life has been studied by Griffith and Gittings,¹ in the case of 226 infants. They believe that the average weight may be considered as 7 pounds, 8 ounces in males and 7 pounds 3 ounces in females, the average difference between the sexes being 5 ounces. From these observations infants weighing from 6 to 9 pounds may apparently be considered normal. In most cases the minimum weight was reached on the third or fourth day and the initial weight was regained between the tenth and fourteenth day. Jacobi in speaking on this subject referred to the importance of giving water freely during the first week to supply the loss.

An extended article on the *relation of the weight to the measurements* of children during the first year is presented by Fleischner.² He asserts that the height and circumference of head, chest, and abdomen, in normal well-nourished children increase as the weight, the greatest increase in the measurements occurring during the first quarter of the year, when the greatest gain in weight takes place. The next greatest increase in weight occurs, coincident with the gain in measurement, during the second quarter of the year, while the least increase in measurement takes place when the gain in the weight is least, the third quarter of the year. In poorly nourished children when the weight is below normal, all measurements are correspondingly below normal. The height and circumference of

¹ Medical Record, September 29, 1906.

² Archives of Pediatrics, October, 1906.

the head reach the normal birth measurements a little ahead of the weight, while the chest and abdomen are two months later in reaching the measurements of a normal child at birth.

When the weight is stationary the increase in the measurements is small, depending upon the slight influence which age has upon the growth of the infant. The measurements of infants of the same weight, notwithstanding the age, are very similar, the small difference depending upon the very slight influence of age upon growth. In general terms it may be said that during the first year of life the primary factor in the increase of measurements of the body is steady, consistent increase in the weight, the influence of age being secondary and much less important.

The Weight of the Viscera in Infancy. The need of some definite standards of the weights of the viscera in infancy and childhood has long been recognized. The figures in Vierordt's tables show certain inconsistencies and are not entirely satisfactory. Moreover they are based on European data. In a paper showing an extraordinary number of observations and a vast amount of labor, Bovaird and Nicoll¹ report the results obtained from autopsies performed during three years at the New York Foundling Hospital. The examinations were made in 571 cases, of which 293 were males and 240 females. All the viscera were examined and a particular study was made of the thymus. It has long been taught that this organ continues to increase up to the end of the second year and then atrophies. The studies of Bovaird and Nicoll show no growth after birth, except in special cases, but rather a gradual involution with slight loss of weight. In some instances it is well known that the gland increases in weight to a remarkable extent and correspondingly in size. The reasons for this increase are not a part of the author's study. The conclusions to be drawn from this interesting study may be stated as follows: The average weights of the viscera in infants and children up to the age of five years show that there is a constant relation between the weights of the more important viscera. The weight of the liver will average seven times that of the heart. The weight of the spleen will average one to ten that of the liver. The weight of the kidney will average one to nine that of the liver. The weight of the thymus gland as commonly given is excessive, owing to the acceptance of pathological glands as the standard for normal conditions. The average weight of the thymus at autopsy is approximately 6 grams. There is no evidence of the growth of the thymus after birth under normal conditions, but under special conditions the gland does grow and may even hypertrophy enormously.

The Stomach in Infancy. The shape and anatomical relations of the stomach in infants and young children were extensively studied a decade or more ago by numerous observers, notably by Holt. Some interesting

¹ Archives of Pediatrics, September, 1906.

observations upon the form and lower boundary of the stomach made by the radioscope are reported by Leven and Barret.¹ The manner of filling the stomach and of its evacuation was also observed. The stomach lies transversely with its greater curvature almost horizontal. The curvature thus forms the lower boundary. In the adult the stomach is much more nearly vertical and the greater curvature forms the left boundary. In the adult, the lowest limit is the region of the pylorus, while in the infant's stomach it is the greater curvature. The normal condition of the infantile stomach, therefore, resembles that of the dilated adult stomach. The methods of evacuation of the infantile and adult stomachs also appear to be different. It requires from an hour and three-quarters to two hours for the infant's stomach to dispose of milk varying in amount from 80 c.c. to 175 c.c.

The Effects of Loss of Sleep in Children. It is the observation of physicians that children bear the loss of sleep badly. Some pertinent observations on that subject are published by Perrier,² who believes that insufficient sleep is the cause of many troublesome symptoms in children. Children of school age lose the ability to fix the attention and become easily fatigued. If insufficient sleep is habitual for extended periods of time, mental development may actually be impaired. The reserve forces of the body are consumed and the child shows no resistance. According to this writer, nine hours of sleep in summer and nine and one-half in winter is the minimum amount requisite for all children. Many require more than this.

The Urine of Infants. The rapid metabolism which occurs in early life and the vulnerability of the kidneys render the evidence presented by urinary examination of particular importance. Chapin³ calls attention to the difficulties met with in attempting to study the urine of infants and regrets the vague and conflicting accounts given by many authors in regard to its excretion. He presents a paper based on several series of cases observed in his hospital wards. In one series of 86 cases of gastrointestinal disease albumin was present in 75 and casts in 37. In 57 cases of acute pulmonary disease, albumin was present in 49 and casts in 32. In 11 cases of cerebral meningitis, 9 showed albumin and casts distinctly.

It is evident that disturbance of the bodily functions during infancy will often be accompanied by the presence of albumin and casts in the urine. Chapin believes that a study of these cases favors the view that they are due to irregularities of the renal tubules and slight congestion and has no special significance. Koplik, in a study of twenty-five consecutive cases of gastroenteritis, found that all but four showed a more or less severe involvement of the kidney. In all of these cases there was

¹ La Presse Medicale, August 8, 1906.

² Ann. de Méd. et Chir. Infant., March, 1906.

³ Archives of Pediatrics, May, 1906.

albuminuria, and the majority of them showed the presence of casts. This author further says that in view of the peculiar physical signs and the rapid improvement of an almost complete suppression, without leaving behind any appreciable lesion of the kidney as evinced by albumin or casts in the urine, it is apparent that we are not dealing with a nephritis in the ordinary, but in a special sense. As in these cases there is usually a great loss of fluid from the system, the toxins circulating in the different organs are thus placed in contact with the delicate cell structures in concentrated form. As soon as the water taken from the system is partially supplied, these poisons are washed from the organs and the latter have the opportunity to resume their functions and are restored to normal. The moral is not to employ irritating antiseptics in the treatment of intestinal diseases and to give a full and free supply of water.

It would seem that we are justified in concluding that the urine of infants may contain traces of albumin and even casts without any very grave results. Even when actual congestion or parenchymatous inflammation exists, it may be remembered that in early age the kidney possesses a wide power of regeneration. Edwards¹ reports cases where the growing kidney presented urine containing both albumin and epithelial cells, and where he was unable to say that either the cardiovascular or the renal apparatus was organically at fault. These cases have been examined in later life and found without demonstrable renal or cardiac diseases. The difficulty of procuring specimens of the infant's urine for examination accounts for much of the laxity in this respect. Chapin² has devised a very clever little instrument for this purpose which he has long used with success.

The Tonsil as a Portal of Microbic Invasion. Much has been written during recent years upon the role of the tonsil in the transmission of the infectious diseases. The subject is of particular interest to pediatric practitioners, for much evidence has been adduced to show that the infectious diseases to which children are especially prone enter the system through the throat. In his presidential address before the American Pediatric Society, Jacobi³ takes issue with the teaching that the tonsil is the vulnerable portion of the throat. He refers to the fact that thirty years ago he made the statement based upon clinical observations that glandular swellings in the neck were rare or comparatively slight in all cases of membranous throat disease confined to the tonsil; and that excessive glandular swelling and constitutional symptoms, often increasing to fatal sepsis, would appear when the local membranous affection of the tonsil extended to the rest of the pharynx or posterior nares. Diphtheria of the posterior nares was recognized as one of the most formidable

¹ Archives of Pediatrics, June, 1905.

² Ibid., July, 1906.

³ Ibid., May, 1906.

forms. This opinion prevailed until Jacobi insisted upon early and regular irrigations of the nares, using either disinfectant or merely cleansing solutions.

The cause of the relative innocence of membranous processes when limited to the tonsils was explained by Jacobi by the thick fibrous capsule surrounding the tonsil, while there was no such obstacle to immediate absorption when the process took place about and near the rest of the lymph apparatus of the nasopharynx. While the normal infantile tonsil, which has not suffered from previous exposure or disease, must be believed to permit some invasion into the tonsillar structures, and sometimes even beyond it, microbic invasion through the tonsil is not predominant over that which takes place over the lymph apparatus of the pharynx. That agrees perfectly with the clinical observations of local toxic affections of the oral cavity, according to which membranous affections limited to the tonsil cause no, or little, adenitis or constitutional symptoms.

An editorial article¹ reviewing the evidence available upon this question, agrees with Jacobi in concluding that there is a certain amount of absorption in and from the tonsil, but it is inferior to that going on in the rest of the copious lymph nets of the pharynx and posterior nares. Its quality depends on the condition of the tonsil. The tonsil should not be credited with the function performed by the numerous and unhampered lymph systems of the nasopharynx. It is as easy to speak of the latter as of the former, and it is more accurate.

Dentition. The subject of the reflexes of dentition has been studied by Dunn,² of Boston. Even yet the influence of dentition is a mooted question and one upon which a variety of opinions has been held. It has assumed a position of varying importance in connection with the diseases of infancy. There was a period in medical history, about one hundred years ago, when dentition was considered the most important cause of infantile disease. Almost every disease to which infants are liable was attributed to the cutting of teeth, and at times the mortality from dentition alone has been placed as high as 50 per cent. There has also been a period of reaction against this extreme view of the significance of dentition. All significance in producing morbid processes has been denied to the process of teething. It was asserted to be a normal physiological process, like the growing of hair, and the supporters of this belief denied that such a normal physiological process could possibly be the cause of any symptoms. It is possible that neither view is correct. Certainly there is no warrant for attributing all, or even a large part, of the ills of infancy to teething. As our knowledge of etiology has progressed, it has become evident that in many of those conditions formerly

¹ Archives of Pediatrics, September, 1906.

² Jour. Amer. Med. Assoc., July 7, 1906.

attributed to dentition it could not possibly be regarded as playing an important part. On the other hand, the view that a normal physiological process cannot be a cause of morbid symptoms is not in accordance with analogy to other normal physiological processes, in which it is certain that numerous morbid conditions can and do occur. Examples of such processes are puberty, pregnancy, and the menopause.

Among the most common diseases attributed to teething are certain reflex disorders. But few of them occur, however, with sufficient frequency to warrant one, after careful study, in considering dentition a potent factor in their causation. Numerous digestive disorders have long been attributed to teething. These disorders are of such frequent occurrence in infancy, however, that coincidence must account for a large number of cases. However, certain cases occur in which a child has been taking a certain food and thriving on it. Suddenly, coincidently with the cutting of a certain tooth, comes a disturbance of the digestion and the child can no longer take this food without vomiting, colic, or more often diarrhea. When the tooth appears the digestive powers once more become normal. It seems justifiable to attribute this phenomenon to a reflex of dentition.

Less convincing is the evidence that certain nervous disturbances are due to teething. Muscular twitching, tetany, and even convulsions occur during the cutting of a tooth. There are, however, conditions from which it is especially difficult to exclude other causes. While we cannot deny the possibility that these symptoms are due to teething, there is little positive clinical evidence in support of their connection with this physiological process.

To sum up: The commonest symptoms seen in dentition are not reflex, but due to pain. They may arise from the tooth cutting the gum, or from irritation at the root of the tooth. The majority of symptoms attributed to a reflex irritation from the tooth are probably mere coincidence. There is a strong probability, based on clinical experience, that dentition may cause fever, disturbance of the ear, and disturbance of digestion. It may possibly cause certain nervous disturbances.

In discussing this subject, Rotch¹ held views very similar to those expressed by Dunn. While he deprecated the habit, more frequent in former times than now, of attributing many of the diseases of children to teething, he is strong in the belief that the teeth are capable of so disturbing the nervous system, which is easily thrown out of gear in a child, as to produce certain reflex nervous symptoms. He believes that a gum may be lanced occasionally to advantage.

Asphyxia Neonatorum. In an extended article on the causes and treatment of this condition, Sheill² discusses the numerous theories and practices of the present day. The prognosis depends upon the prompti-

¹ Jour. Amer. Med. Assoc., July 7, 1906.

² Practitioner, September, 1906.

tude and efficiency of the treatment, as well as on the original cause. The most active efforts should be directed toward establishing the working action of the heart and lungs and at the same time to prevent a fall in the body temperature.

The treatment of asphyxia is minutely described. The child is placed in a bath at 110° F. in position for Silvester's method, with its head and face above the water. A small clip forceps is placed on its tongue and allowed to hang to one side, using the angle of the child's mouth as a fulcrum to draw the tongue forward and to keep it there. Counter-traction is made by the nurse or other assistant on the infant's feet, while the typical Sylvester method of artificial respiration is performed. Meanwhile a solution of belladonna, strychnine, and whiskey is injected over the deltoid. About two ounces of water are injected gently into the child's rectum. At intervals the child is lifted out of the water; while suspended by the feet, its spine is well rubbed with whiskey or camphor liniment. As the child is lifted from the bath, the temperature of which is maintained at its original height, it is suspended as before, and may occasionally be slapped, rubbed, and the face blown on with the breath, especially the latter, which tends to stimulate reflexly the respirations. A little later a splash of cold water down the child's spine, or more effective still, in the face, will probably produce a gasp. Sylvester's method, unlike Schultze's, can be timed to act with the respiratory efforts of the child. When it gasps, this being an inspiratory effort, draw up the arms quickly, and when it cries, however feebly, compress the thorax to assist the expiration. The cold bath should not be used until well into the livid state with a strongly beating heart, otherwise a fatal collapse may result.

A new method of treatment is described by Himmelsbach.¹ This method has been applied successfully in twenty cases, and consists of a hypodermic injection of $\frac{1}{1500}$ grain of sulphate of strychnine and $\frac{1}{2000}$ grain of sulphate of atropine. The newness alleged must rest in the size of the doses, for hypodermic injections are not new as a means of resuscitation. Evidence has been produced which seems to show that a hypodermic of plain water is as effective as is the injection of drugs, and is certainly safer. An important feature in every attempt at resuscitation is the maintenance of the body heat. This is often neglected and brings to naught the best methods of treatment.

Hemorrhages in Newborn Children. The etiology and pathogenesis of the more severe forms of hemorrhage in newborn infants is the subject of an extended paper by Lequeux.² He holds that all forms of hemorrhage during the first two weeks of life are due to bacterial infection. In this he is in accord with all modern belief. The condition is a general

¹ California State Journal of Medicine, February, 1906.

² L'Ostetrique, March 19, 1906.

one of which the hemorrhage is a single symptom. The character of the blood is radically altered. Polycythemia appears and normoblasts occur irregularly. A polynuclear leukocytosis at first occurs, but becomes later mononuclear. The serum undergoes certain changes and free pigment appears. The clot forms with difficulty and its retractability is lost. All the conditions necessary for the production of hemorrhage are present. Alteration of the bloodvessels, changes in the blood and in the vasomotor relations causing passive dilatation are all present. The author reports 44 cases of hemorrhage among 2162 infants, of which but 25 were external. In 10 cases they were multiple, being both internal and external. In three they were umbilical; in 4, gastrointestinal; in 2, cerebral; in 6, cutaneous and mucous; and in 18, visceral. The author holds that heredity is a potent factor in causing these hemorrhagic conditions. Hemophilia, syphilis, albuminuria, eclampsia, nephritis, alcoholism, and lead poisoning in the mother are all contributory causes. They prepare the ground for bacteria, which are the exciting cause of the condition. The liver and spleen are the organs most involved and septicemia is the most important causative factor.

The hemorrhages of the newborn usually occur during the first fifteen days of life, a majority appearing before the sixth day. An unusual case is described by Cathala and Lequeux¹ as occurring at the end of the first month, the hemorrhages being unusually serious. The patient was a twin and the other twin remained well. The infection was believed to have originated from a mild gastrointestinal disorder. Streptococci were found in the blood.

The subject of *hemophilia in newborn children* is studied by Larrabee, of Boston.² With other authors, he believes that uncontrollable hemorrhage in very young infants results from bacterial infection. He reports 37 cases showing a mortality of 60 per cent. One case is of particular interest because of the strong hereditary history. In the family of this child there had occurred 15 known cases of hemophilia, of which 6 were females. Of these 15 individuals, 10 inherited the disease through a male parent. These figures do not include 7 cases of slight severity, or those with incomplete histories. In concluding, Larrabee emphasizes the fact that hemophilia is but a rare cause of uncontrollable hemorrhage in the newborn. The importance of this is obvious. Given an infant suffering from this condition, the chances are all in favor of its being due to a cause which is but temporary. No effort should be spared to save the child, since if it survives for a few days there is every probability of continued health.

Cases of *fatal hemorrhage in newborn infants* are reported by Parke,³ of Birmingham, in which profuse hemorrhage into the abdominal cavity

¹ Bulletin de la Soc. d'Obst. de Paris, December 31, 1906.

² Amer. Jour. of Med. Sci., March, 1906.

³ Archives of Pediatrics, September, 1906.

was discovered upon postmortem examination. A case of death from intracranial hemorrhage is reported by Turnbull,¹ who discusses the etiology of such accidents. He believes that high cerebral blood pressure resulting from difficult labor is a more common cause than direct injury of the head from the forceps and pelvic bones. In this he is in accord with most recent writers. He disapproves of craniotomy for the purpose of ligating a ruptured vessel, believing that it would be impossible to locate and discover it.

It is asserted by McClanahan,² of Omaha, that hemorrhage which occurs during the first twenty-four hours after delivery is usually traumatic. In hemorrhage at a later period other causes must be sought. In spontaneous hemorrhage the blood may flow from any mucous surface or beneath the skin. By combining the statistics of Ritter, of Prague, Townsend, of Boston, and Abt, of Chicago, the source of the hemorrhage was as follows: Umbilical, 161; intestinal, 66; mouth, 49; stomach, 37; conjunctiva, 20; ears, 10; nose, 16; ecchymosis, 27; lungs, 1; vagina, 2. It should be understood that in many of these statistics the hemorrhage was from more than one point, but the chief source of hemorrhage only is mentioned.

Hernia in Young Children. Although hernia is not uncommon in young children, it is the common belief that strangulation is rare. In a discussion on this subject,³ Deaver confirmed this opinion. Although long associated with two children's hospitals, he had seen very few *strangulated hernias*. The youngest child was four weeks old. Wharton also agreed that strangulation under twelve years is rare. He had operated on but one patient under one year of age, and that an infant of three weeks. When hernia does require operation in children they usually do well and almost any method of radical cure is followed by good results. A case of successful operation for strangulated hernia in an infant of five weeks is reported by Nassau.⁴ In the same journal a successful operation on an infant of thirty-four days is reported by Mutschler. He also reports a case of hernia of the vermiform appendix with a pin in the appendix. The patient was seven months old and was operated upon successfully.

A method of cure of *umbilical hernia* by subcutaneous injections of alcohol is described by Lidmanowsky.⁵ After pushing back the contents of the hernia into the abdomen, he introduces the tip of the index finger into the umbilical orifice to avoid any risk of infecting the peritoneal cavity, and, with a small needle introduced under the skin around the hernia, he injects in different places 1 c.c. of alcohol. This being done, a gauze compress containing a piece of money is applied to

¹ Brit. Med. Jour., March 24, 1906.

² Jour. Amer. Med. Assoc., October 13, 1906.

³ Archives of Pediatrics, June, 1906.

⁴ Ibid., June, 1906.

⁵ Bell. méd., April 14, 1906; New York Med. Jour., October 6, 1906.

the surface, over which is placed some cotton, and this is retained by a roller bandage. This dressing is not disturbed for a week. At the end of this period another injection of alcohol is made as before. The obliteration of the hernial orifice is secured after three or four injections.

Tetanus Neonatorum. This important subject is considered by Anders and Morgan.¹ Their studies embrace 1276 cases collected from literature, from 1850 to 1905, and 31 original cases, a total of 1307 cases. The paper is limited to the study of the disease in the newborn child, with infection through the umbilicus. All observers are unanimous in declaring that the most prolific cause of the occurrence and mortality is unclean midwifery. Suggestions as to prophylaxis are submitted as follows: The education of persons directly or indirectly connected with the care of confinement cases should be insisted upon, especially as to the necessity for rigid, aseptic, hygienic care of the umbilical stump and its treatment along the same strict lines as any other surgical wound. To this end a law in every State requiring registration of midwives should be enacted. Medical colleges should teach this phase of the matter with greater earnestness than is now being done. Likewise information on the tetanus bacillus should be fully presented. State Boards of Health should issue circulars of information for the guidance and direction of midwives and others who attend these cases. Philanthropic societies and institutions should also take up the question and cause a widespread knowledge of the simple measures necessary for the prevention of this disease.

Hematoma. A hematoma of unusual size is reported by Bannan,² of Syracuse. He asserts that characteristic tumors of this type are smooth, tense, fluctuating, sharply outlined, limited by the sutures, unaffected by change of position, and with the base as extensive as the greatest circumference, apparently painless, and occurring after birth. They are free from the scalp, which they lift almost at right angles from the skull. The circumference of the base of the tumor feels like the edge of a bone marking an opening in the skull beneath the tumor base. At first, however, if the child's head is examined and found normal the evidence is found contradictory. So, too, when the tumor gradually increases in size and changes its circumference, there is a sensation of an opening in the skull, where a few hours before was palpable bone. The cause of these tumors might be interesting if known. Theoretically, pressure during labor or by the forceps might be the cause. In practice, however, severe labors and instrumental deliveries are not as a rule followed by hematoma. No treatment except hygienic care seems indicated.

Rachitis. An attempt to trace the relation of rickets to the period of lactation is made by Dingwall-Fordyce.³ His observations were made

¹ Medical Record, August 4, 1906. ² Jour. Amer. Med. Assoc., July 28, 1906.

³ Brit. Med. Jour., April 28, 1906.

upon two hundred children ranging in age from six months to three years. There was but little difference in the frequency of the condition in the mixed-fed and the bottle-fed. The number of extreme cases was, however, greater among the latter class. There was an increase in the amount of rickets with succeeding breast-fed children in the family. After the third child the amount of rickets among the breast fed actually exceeded that of corresponding children bottle fed.

A peculiar case of marked *angular deformity of both clavicles* in an extremely rachitic child is reported by H. R. Owen.¹ The child had been nursed for sixteen months and was then placed upon a general mixed diet. A case of *rickets* with *hydrocephalus* is reported by Cleaves,² the point of chief interest being the fact that improvement appeared to follow treatment by radiant energy. From cases of this character now on record it would seem that if any beneficial result is to be obtained from this treatment, the case must be recognized in its incipency and treatment begun at once. A case believed to be one of rickets in a boy of twelve years is reported by Schwarz.³ It was apparently rickets of persistent form, though the diagnosis is open to some question.

Abdominal distention is one of the most constant and characteristic symptoms of rickets. This is due largely to weakness and atony of the abdominal muscles. The subject is discussed by Ewart,⁴ who points out the effects on the gastrointestinal motor functions both as to excretion and secretion. Two measures are of great value in the treatment of the abdominal atony: 1. Massage of the abdomen, which invigorates the muscles, reduces the distention, disperses visceral congestion, and assists respiration. 2. The use of an elastic abdominal belt. This is automatic, gives lateral support to the weak abdominal parietes, improves the distribution of the blood, and corrects the apparent oligemia, and is of the greatest assistance to the respiration. Above all it stimulates the growth of the abdominal muscles.

Achondroplasia. True examples of this disease are rare. It was formerly described as congenital rickets and is easily mistaken for rickets on casual examination. It is, however, totally different from rickets in its nature and causes, and shows marked differences in its physical signs. A case is reported by Rankin and Makay,⁵ who point out certain characteristics in the disease which distinguish it from rickets. Among these are an abnormally large vault to the cranium, depression of the root of the nose, prognathism; arrested development of the long bones of the extremities, with exaggeration of their normal curves; beaded ribs and enlargement at the ends of the long bones from diaphyseal and epiphyseal changes; decentralization of the midpoint of the body, which is

¹ Archives of Pediatrics., January, 1906.

² Ibid., February, 1906.

³ Medical Record, October 27, 1906.

⁴ Brit. Med. Jour., October 13, 1906.

⁵ Berl. klin. Woch., June 25, 1906.

invariably and persistently above and not below the navel; characteristic appearance of the hands (Marie's main-en-trident); excess of adipose tissue; protuberant abdomen; lordosis; smooth, pliable skin, with abundance of glossy hair in all the ordinary situations; a normal mentality, and finally a tendency to other malformations, especially high-arched palate and inguinal hernia. Minutely described cases are reported by Auché,¹ Keyser,² and Heiman.³

Enuresis. The involuntary discharge of urine is a condition normal to infancy. As a voluntary function it is normal only to a later period. Kerley⁴ asserts that under proper management control may be obtained by the tenth month during the waking hours. He does not regard loss of control at night as abnormal until the third year is completed. However, if a child shows a tendency to involuntary passage of urine during waking hours with habitual incontinence at night, preventive measures should be adopted. After mentioning various physical conditions which may tend to this end he asserts that the use of highly nitrogeous food in large amount may lead to changes in the urine sufficient to destroy the control. The use of a diet overrich in sugar may produce the same result, but after all possible dietetic and local causes have been eliminated a large number of cases will remain. These are due to a neurosis, and are not dependent upon any discoverable pathological condition, and should be treated accordingly. A light, dry supper; early retiring, to be awakened during the night to urinate; light covering at night; sleeping, if possible, on the right side. Among the drugs the author mentions atropine; while in weak, poorly nourished children strychnine may be added to iron or oil tonics.

The complex nature of enuresis is emphasized by Carrieré and Caudron.⁵ They refer also to the great number of causative conditions, but lay especial stress upon abnormal urinal acidity. In treatment they, therefore, advise the prolonged administration of an alkali, particularly the bicarbonate of soda. This treatment should be continued for a long period after the last symptoms have disappeared. Nervous instability, either hereditary or acquired, is regarded by Thursfield⁶ as the most important factor. He regards belladonna or its alkaloids as the most effective drugs. In considering the treatment of enuresis P. G. Lewis⁷ asserts that we should consider: whether the case is one of general want of tone; whether the urine passed at night is abnormally acid and of diminished quantity, or of low specific gravity, alkaline or neutral, and of increased quantity; whether the case is simply one of habit remaining after the cause has been removed, or after improvement in the general

¹ Jour. de méd. de Bordeaux, January 28, 1906.

² Lancet, June 9, 1906.

³ Medical Record, February 17, 1906.

⁴ Boston Med. and Surg. Jour., August 16, 1906.

⁵ Le Nord méd., July 15, 1906.

⁶ Brit. Med. Jour., April 21, 1906.

⁷ Ibid.

health has become such that enuresis need not occur. Tonics are indicated in the first class. In the second class meat should be cut off in the acid form, and a non-farinaceous diet should be given in the alkaline form. All causes producing intestinal sepsis are to be sought for and removed.

In an extended and most satisfactory editorial review of the treatment of nocturnal enuresis,¹ belladonna and nux vomica are given the first place in the medical treatment. As a matter of fact but little that is new or valuable has been suggested recently in the treatment of this disorder. It is a common experience that children tolerate belladonna comparatively well. Two cases are reported by Lowenberg² in which extraordinary tolerance for belladonna was exhibited. In discussing these cases, Griffith³ agreed with the general principle that comparatively large doses can be given to children, but uttered a warning against presuming on the fact. They are sometimes very sensible to it and each case should be determined for itself. Such a warning is timely, for children, like adults, sometimes show great susceptibility to belladonna and atropine, and the first doses should be given with more caution than is sometimes observed.

Nervousness in Children. Some most sensible and valuable suggestions are offered by Archibald Church⁴ on nervousness in children and on the nervous element which underlies certain symptoms common to children. The practitioner is prone to forget that a substratum of nervous instability lies at the bottom of many conditions which cannot be strictly classified as nervous diseases. He mentions *enuresis* as coming under this category. Local conditions found in association with inability to control the outlet of the bladder may furnish the exciting cause, but the underlying substratum of perverted innervation or incompetent innervation is the field in which such exciting cause works, and only too frequently the correcting of every local and mechanical state fails to relieve the enuresis. The fact that this condition is amenable to mental measures, and in high degree to suggestion, stamps its nervous and even its psychical character.

True *night terror* is another condition in which the nervous element is very important. The child wakes from sleep in a frenzy of terror, a temporary, fugacious delirium, in which it does not recognize its parents, cannot be reassured and, after a period of from a few minutes to an hour, subsides again into sleep and wakes in the morning without any recollection of the turmoil through which it has gone. This sleep disorder is commonly attributed to indigestion or to lack of pulmonary ventilation commonly associated with adenoids, enlarged tonsils, or heart disease.

¹ Jour. Amer. Med. Assoc., June 9, 1906.

² Archives of Pediatrics, October, 1906.

³ Ibid.

⁴ Ibid., September, 1906.

All these conditions should be removed, but it should always be borne in mind in addition that there is a more or less marked nervous instability and neurotic element.

Convulsions in infancy are almost entirely dependent upon an underlying nervous element. Conditions that in one child will produce no disturbance, in a child of neurotic tendency will precipitate a convulsion. In investigating a large number of epileptics, Church found that in over 50 per cent. there was a history of early convulsions associated with teething, worms, febriculæ, or other trifling physical disturbances. Retardation of the development of speech, and speech defects, such as stammering or unusual lisping, are the common appanage of nervous children; children, not merely of nervous temperament, but of neurotic tendency. While stammering and backwardness of speech may be associated with defects of the mouth parts or articulating organs, these defects are additional stigmata of an unfinished state. It is the experience of every practitioner that among certain nervous children there is a tendency to delirium toward or in the night attending low grades of fever. With some children the temperature never reaches 100° F. without accompanying flightiness. A study of this tendency of children to manifest mental disturbances of a delirious character under slight degrees of fever furnishes a very definite index as to their nervous and mental stability.

Dermatitis herpetiformis, xeroderma pigmentosum, ichthyosis, vitiligo, and scleroderma are practically always the earmarks of the neurotic make-up. Of the same significance is the fact that certain children are susceptible to attacks of all sorts of zymotic infections. Some children "take everything." This lack of resistance is commonly coupled with a bad heredity; that is, bad in point of view of nervous stability and mental poise.

Some children become insane, and insanity in children, as insanity in adolescence, is almost invariably a manifestation of hereditary tendencies. To be sure, children are not admitted to insane asylums, because the diseases of childhood capable of being dignified by the term of insanity are either temporary or slight or run into early imbecility. Nevertheless many of the mental states are so perturbed in childhood as to constitute actual alienation. Early overconscientiousness, morbid ideas of self-destruction, sometimes even terminating in suicide, fits of blues of a protracted nature, loss of self-reliance, dependence upon the presence of certain individuals, protracted attacks of viciousness, destructiveness, and the manifestation of cruel instincts, morbid disobedience, and many similar manifestations of disturbed character and mental action are so commonly encountered that one wonders that their significance is not more clearly apprehended. Every alienist knows cases of children who have presented well-marked phases of melancholia and phases of a maniacal sort, frequently in alternation, and the outlook for those so

afflicted is indeed gloomy. Morbidly active mentality in children, such as precocity in certain lines, leading to the supposition of the possession of talent or genius, are always ominous, and the asylum only too commonly claims as its toll those who thus early manifest their unfitness for social conditions.

The possibility of *hysteria* in childhood is emphasized by Burns.¹ It may assume certain forms similar to that of adults and others that are quite different. When marked it is difficult of treatment without removal from home and surroundings. From references in literature it would seem not improbable that the condition is more prevalent in France and Germany than in this country. An epidemic of a peculiar nervous and probably hysterical affection among school children of Meissen is reported by Schütte.² The condition was characterized by marked trembling of the right forearm and hand. This occurred in paroxysms lasting from a few minutes to half an hour. The epidemic spread rapidly, autosuggestion being apparently an important factor. No relief was obtained without removal from school and rest in bed.

The Temperature in Infants and Children. The practitioner is constantly seeking for methods in his daily work which combine accuracy and convenience. It has long been the teaching that in children the rectal temperature is the most accurate. As a routine method of taking temperature it has objectional features. Parks,³ of Chicago, has made extended observations upon temperatures in the closed inguinal fold as compared to rectal temperatures, which show it to be a very accurate and satisfactory method. It is in fact the method adopted by many physicians in all cases. I have long used this method, having regarded it as more satisfactory in most cases than either the rectal or axillary method.

According to the observations of Parks the normal temperature of the closed inguinal fold of a child is 98.52° F. (37.5° C.). The variation of the inguinal temperature from the rectal temperature approximates one-third of a degree Fahrenheit or two-fifths of a degree Centigrade, the average variation being 0.34° F. (0.18° C.). That is, the inguinal temperature is approximately one-third of a degree Fahrenheit (two-fifths Centigrade) below rectal temperature. The usual variation between the rectum and groin is so small as to be practically disregarded for clinical purposes. The absence of many objectional features of the rectal method and the ease and reliability of the groin method gives the latter several points of advantage over the rectal method. The advantages of the groin method would recommend it as not only applicable in hospital practice in pediatrics, but more especially in home practice among children.

¹ Neurol. Centralbl., May 16, 1906. ² Münch. med. Woch., September 4, 1906.

³ Jour. of Amer. Med. Assoc., September 29, 1906.

Breast Feeding. In an extended article on the passing of the nursing mother, G. D. Scott,¹ of New York, asserts that the conditions working against the nursing mother may be summed up under four heads: economical, psychological, physiological, and pathological. In 1900 there were only three-quarters as many living children to each 1000 potential mothers as in 1860. The birth rate over this country has persistently decreased. Gen. F. A. Walker says that owing to the increase in immigration the growth of the native population has been severely checked, this influx constituting a decided shock to the principle of population among the native element. That principle is always acutely sensitive alike to sentimental and economical conditions. It was also proved that the decline in the native population as a whole took place in just those localities where the newcomers most freely resorted. General Walker concludes that foreign immigration into this country from the time when it first assumed large proportions amounted not to a reinforcement of our population, but to a replacement of native by foreign stock. That the diminution in the birth rates indicated a progressive diminution in fertility of American stock to produce children in either or both sexes is not warranted. It has been suggested that alcohol, tobacco, and syphilis are producing a deterioration of race; but of this there is not sufficient evidence.

It is to be noticed that the smallest proportion of children is in the Northeastern States, Massachusetts coming next after the District of Columbia in the small number of children. The District of Columbia, all the New England States, New York, and Ohio have less than 400 children to 1000 women; California also comes under this heading. Strange to say, the decades having the smallest decrease in the proportion of children were those immediately following a vast influx of immigrants. It is probable that these immigrants living in the United States under conditions much superior to similar conditions in Europe, and belonging mostly to the young adult class, would have during the years following their arrival a very large birth rate. The proportion of children in the United States decreased in the last decade by 11 per cent. This decrease occurred chiefly in the cities, for in the country districts it was but 2 per cent.

The results of emotion, pain, or shock cause some not as yet understood chemical changes within the body, no doubt affecting the blood, and this in turn the milk. Neurasthenics have unusually poor breast milk, and the same is true of users of alcohol in excess. When we realize how important is hygienic discipline in the making of good breast milk we shall have gone a long way toward securing healthy children. To the nursing mother physicians too often give indefinite directions as to meat eating, massage, bathing, the use of alcohol, milk drinking, cocoa

¹ Medical Record, March 31, 1906.

drinking, and the necessity for regular periods of eating. There is a condition in many a nursing mother which works damage upon the present and future welfare of the infant. This is the as yet not understood condition of autointoxication.

Rachford says that autointoxication is the most important and least understood of all causes of neurotic diseases in infancy and childhood. These poisons are not of microbic origin, but are substances formed by various organs in the body to serve some normal purpose, and pathological only when they are accumulated in excess in the body and tissue; or they are substances formed either normally or abnormally in tissue changes incident to functional activity of muscles and other organs. Proper diet and hygienic care are the measures to be adopted for the prevention of these conditions of autointoxication.

Artificial Food. In studying the literature of artificial feeding for many years, one is impressed by the unanimity of opinion that there is but one substitute food, and that food is cows' milk. Other foods are advised for temporary use in certain acute diseased conditions or to tide over emergencies. Among writers of experience it has long been a settled conclusion that for continuous use cows' milk, notwithstanding certain drawbacks, is the most satisfactory substitute for breast milk. Gilbert,¹ of Portland, enumerates fifteen qualities desirable in milk to be used for human food. He also considers the main breeds of dairy cows with a view of selecting the breed best adapted to fill these requirements. The desirable qualities of milk are those which have frequently been referred to in this article during the past eight years. After a consideration of the various dairy breeds, particularly the Jerseys, Guernseys, Ayrshires, and Holsteins, Gilbert is strong in the approval of the last named. He believes that the Holstein cow most nearly fills the requirements he has laid down for a good milk producer. For two thousand years the Holstein cattle have been bred in the confines of Holland as milk, butter, and beef producers, and the results obtained have shown the remarkable success of the quiet Dutch. The Holland dairymen are not marvelously good tempered, but they recognize the fact that harsh treatment is poor economy. They have learned that all nervous excitement, of whatever nature, lessens milk production. Hence, not only in management, but in breeding, they seek to perpetuate quietness of disposition. The uneasy, fighting temperament that a class of American dairymen is trying to exalt into a bovine virtue must be regarded as a great vice in a milch cow.

In considering the production of certified milk in small cities, Brown² reports some interesting experiments in Elmira, N. Y. Since the Commission formed through Dr. Coit, in 1893, thirteen other Commissions have been started. All, however, are in cities of the first or second class.

¹ Medical Record, October 22, 1906.

² Medical Record, August 4, 1906.

The efforts of the Milk Commission of the Elmira Academy of Medicine resulted in finding a woman who was willing to take up the work, and who already had a general knowledge of the benefits of clean milk and the requirements necessary to produce it. She built a new barn, had her herd tested for tuberculosis, the Commission selected its experts, and the first certificate was issued April 15, 1903. A standard of 10,000 bacterial count was established and the other usual conditions were imposed. The milk was cooled and bottled within a few minutes after it was drawn and was put in a crate the top of which was filled with cracked ice. The night and morning milk was delivered to the consumer not more than ten hours from the time the oldest of it was drawn the night before. This was accomplished by simply using the means at hand, and what has been done in Elmira could be done in a score of other cities of the same size.

Some peculiar observations on the action of sunlight on milk are reported by Much and Römer,¹ in which they assert that not only is the taste of milk quickly changed, but the fat is so altered by oxidation as to become injurious to infants. The wrapping of milk bottles in black or green paper is advised. The same authors have used peroxide of hydrogen as a germicide, which is then eliminated by a special ferment. It is asserted that this process will destroy tubercule bacilli. Such methods have never been countenanced in this country. It has been felt that the only safe precaution against virulent germs of that type is absolute exclusion.

Infant Feeding. The large number of contributions upon this subject would seem to indicate two facts, namely, the extreme importance of the subject and its still unsettled condition. That it is a subject of growing importance is clearly evident. An increasing number of mothers are unable to nurse their children, but at the same time the future welfare of the race requires the best possible nutrition for its infants. That there are still many unsettled questions is made evident by the variety of opinions expressed upon various mooted points and by the great number of expedients proposed to overcome the difficulties encountered. To those who have made a study of the subject, the feeding problem is certainly less difficult than it was a few years ago and much more satisfactory. A large number of practitioners, however, assume the responsibility of feeding children without sufficiently informing themselves either as to the fundamental principles or the details. The knowledge of certain principles is requisite to the successful feeding of infants. The chief point of difficulty lies in inability to apply this knowledge in a practical way. The two things most requisite for the general practitioner, as Holt² has well pointed out, is the power to recognize the various

¹ Berl. klin. Woch., 1906, xliii, No. 31.

² Archives of Pediatrics, November, 1906.

clinical indications presented and the ability to adapt his feeding to meet them.

In an article on the trend of pediatric opinion concerning the artificial feeding of infants, Southworth¹ outlines in a most satisfactory manner the present knowledge of the subject and the problems that are to be solved. He asserts that a satisfactory working hypothesis having been established some years ago, the spirit of inquiry is now engaged in proving this structure and explaining the principles upon which it rests. Those portions which do not stand the test are being rapidly replaced by sounder material. Our labor in this direction is far from completed. Among the fundamental principles, one has been forced upon us by the study of comparative anatomy and physiology of mammalian species. It is the fact that milk must be the basis of an infant's food, because milk proteid is alone capable of forming, with the secretions of the stomach, the soft solids requisite to the development of that organ so as to fit the infant later for subsistence on the mixed diet of the adult. Cows' milk at present is the only milk obtainable commercially in sufficient quantities to meet the needs of the really appalling numbers of infants who for valid or invalid reasons are deprived of their normal food. Some of our chief problems of infant feeding have centred, therefore, about our efforts to adapt this milk of a foreign species to the infant's digestion. The inherent differences in the caseins of cows' milk and human milk and the size and character of the curds formed in the infant's stomach enhance the difficulties. Practically all methods of preparing the milk for the infant that are of real value have the common purpose of enabling the infant to digest successfully the casein of cows' milk in sufficient quantity to thrive.

In considering the subject of infant feeding, Southworth believes that in scope and elasticity the percentage method far surpasses all previous efforts, because it enables us, as never before, to control intelligently and with approximate accuracy the constituent elements of the food for each individual infant. No method of artificial feeding, however, can properly replace the physiologically adapted milk of the human breast among the great mass of our population. Artificial feeding is undoubtedly attended with more danger than breast feeding. The two alternatives should not be offered lightly to the mother as though they were of equal value. While bad breast milk, if it is really bad, is worse than good artificial feeding, the nervously and socially overwrought mother does not make up the vast bulk of the motherhood of our country. Breast milk which is good and plentiful, or can be made so with a little rational attention, far surpasses as a food that which is furnished by the cow, and is infinitely beyond the combinations of the manufacturing chemist.

Milk formulas are accessible in several standard text-books. Those,

¹ Jour. Amer. Med. Assoc., October 6, 1906.

however, who are satisfied with securing a few stock formulas will seldom attain to genuine success in milk feeding. Those who have no clear conception of the purpose subserved by the various component parts of the food nor of the indications for varying these have no clue to the solution of difficulties as they arise, and readily fall victims to the seductive claims of the patented foods.

The use of cows' milk as a substitute food for infants is urged by Jacobi¹ as well as the importance of feeding each infant as an individual. A plea for more uniformity in the teaching of infant feeding and in the nomenclature is made by Chapin.² He asserts that the subject has not been made as clear to students and practitioners as it should have been made, and nomenclature should be made more exact. Townsend,³ of Boston, urges the desirability of greater simplicity in infant feeding. He advocates the use of gravity cream and cereal water as diluents.

In reviewing the literature of the past year, we find that two subjects have received particular attention and stand out as pre-eminent. The first of these is the fat problem and the second the use of citrate of sodium. Two years ago Holt issued a strong note of warning against too high percentage of *fat* and returns again to the same subject.⁴ He believes that even with healthy infants it is never wise to carry the proportion of fat in a milk formula above 4 per cent.; that there are many conditions and many infants in which 3 per cent. is excessive; and that there are some infants, particularly those with digestive disturbances, for whom 1 per cent. is the limit. The same warning is also contained in a recent editorial article,⁵ in which the fact is referred to that with any new method of treatment it takes years to determine its true place and value. Its advantages are patent early; only after an improved method has been used for some time are its limitations and contraindications understood. In infant feeding the introduction of mixtures of top-milk or of cream instead of whole milk marked an advance in rational management; but contraindications against the use of overfat milk are being constantly encountered; so that more attention must be paid to the effects of the fat. In the same Journal, Sedgwick, of Minneapolis, reports some extended experiments from which he concludes that there is a fat-splitting ferment in the infant's stomach which can be demonstrated as early as the second week. After the first half-hour after feeding the fat splitting increases slowly but steadily. Bell,⁶ of Englewood, has also made experiments and observations in the same direction and concludes that the digestion of fat retards the flow and diminishes the amount of gastric juice, at the same time lowering the digestive power. The ingestion of fluid oil increases the flow of pancreatic juice and probably the activity of its fat-splitting enzyme, steapsin. In case the fat

¹ Maryland Med. Jour., June, 1906. ² Medical Record, September 29, 1906.

³ Ibid., August 4, 1906.

⁴ Archives of Pediatrics, November, 1906.

⁵ Ibid., June, 1906.

⁶ Ibid., March, 1906.

is not fluid at body temperature, it may still further retard and prevent the flow of gastric juice, coating over the gastric mucous membrane, thereby mechanically interfering with secretion. In the case of coagulable food, such as caseinogen, it may cover the curds with a layer of insoluble fat, thereby preventing the action of gastric juice on them and permitting the curd to pass undigested.

An interesting study of the variation in the *fat percentages of mothers' milk* is reported by Taylor-Jones,¹ in which it would appear that the fat is sometimes more variable than it has been credited with being. For the most part fat gradually increases in amount from the beginning to the end of a feeding, with occasionally a dip down at the end. A baby that needs more fat than it is getting can easily be put to the breast after some milk has been pumped out.

A large number of articles have appeared on the use of *citrate of sodium* in the food of infants. This element produces very different chemical changes from those which follow the use of the usual alkalis. Under its influence it has been believed that the casein is decalcified and a sodium casein is produced, which rennet does not affect; so that acid forms with it only the type of curd which acid forms with it outside of the body. The curd formed when it is used is small and soft and wholly different from that formed without it. The milk passes from the stomach in a liquid or semiliquid state. It was first extensively used by F. J. Poynton, at the Great Ormond Street Hospital, London. Southworth² says that his experience with the employment of from 1 to 2 grains of citrate of sodium to each ounce of actual milk in the feeding has been sufficiently favorable to warrant the belief that it is worthy of a more extended trial in selected cases than it has as yet apparently received in this country. Observations on its use are also reported by Shaw,³ of Albany. He employed a solution of such a strength that each teaspoonful contained 10 grains, and it was added in such a proportion that there was 1 grain of citrate of sodium to each ounce of milk in the bottle. Occasionally as much as 3 grains to each ounce was used. There was no taste and the children took it readily. Shaw concludes that because of the ease of preparation, the simplicity of the method, and the cheapness of the ingredients, this plan affords a valuable method in cases of proteid indigestion. This article of Shaw is favorably commented upon in an editorial article (*Therapeutic Gazette*, May 15, 1906).

Citrate of sodium has also been used successfully by Wynn.⁴ One of the chief difficulties encountered in feeding infants with cows' milk is the density of the clot formed in the stomach. Sodium citrate lessens the amount of clot formed. By its use milk can be given in a more concentrated form and over-dilution prevented. Its chief indications are

¹ Archives of Pediatrics, July, 1906. ² Jour. Amer. Med. Assoc., October 6, 1906.

³ Archives of Pediatrics, March, 1906.

⁴ Birmingham Medical Review, April, 1906.

for correcting milk dyspepsia and for weaning a healthy infant to cows' milk. It is useless in severe gastroenteritis, fat dyspepsia, when the milk is impure or adulterated, and in primary infantile atrophy. England,¹ of Philadelphia, has studied the subject from its chemical and physical side solely, and is of the opinion that when the citrated milk is brought in contact with the gastric juice, the sodium citrate is decomposed into sodium chloride and that sodium chloride has important physical, chemical, and therapeutic properties in the digestion of cows' milk. A. C. Cotton² has studied the question of the comparative action of citrate of sodium and other methods of checking coagulation. He believes that in 0.25 per cent. or more strength it retards coagulation, and very high percentages inhibit it. The presence of HCl hastens coagulation. Diluting milk generally retards coagulation. Gruels appear to have little effect in retarding coagulation, or no more than water. The coagula of citrated milk are softer, smoother, and more jelly-like or more flocculent than those of milk not thus treated. Sodium citrate being soluble in water, a solution is prescribed with instructions to add to the baby's bottle just before feeding enough to represent 1, 2, or even 3 grains of the citrate to each ounce of milk in the feeding mixture.

The temporary use of *malted gruel* when milk is not tolerated is especially commended by Terrien.³ The dilution of milk with gruels or dextrinized gruels to modify the curds mechanically is also the subject of a paper by Chapin.⁴ He asserts that most methods have some scientific basis, and the one to be used must be left to the physician after he knows the principles involved. He must decide whether or not he will feed the casein combined with the alkalies or citrate of soda so that no curd will form, or whether he will break up the curd with a gruel and allow digestion to proceed and a normal digestive tract to be developed. The day has gone by when it can be taught that different procedures are employed for the purpose of making cows' milk like human milk.

The Management of Infants During Hot Weather. The great mortality among infants during the summer months renders that portion of the year one of great importance to the pediatric practitioner. Before such management can be placed on a scientific basis the principles on which it is founded should be ascertained. The normal processes and requirements during warm weather should be clearly understood, and also how these processes may be deranged and the requirements met under different conditions. The subject has received very careful consideration from Pisek.⁵ He points out the important fact that prepared foods, special percentage mixtures, sterilization, and pasteurization have been

¹ Jour. Amer. Med. Assoc., October 20, 1906.

² Ibid., October 6, 1906.

³ Rev. mens. de mal. de l'enf., March, 1906

⁴ Archives of Pediatrics, February, 1906.

⁵ Jour. Amer. Med. Assoc., April 11, 1906.

offered as the solution for summer digestive disturbances. Recently a specific organism has been held accountable and a specific serum has been suggested as a positive curative agent; but still the problem confronts us.

The real progress that has been made in the treatment of summer cases has not been the result of specific medication or of specific feeding, but has come from close attention to diet and care. Park and Holt¹ reported three years ago, as the result of their investigations, that care was fully of as much importance as food in the reduction of sickness and death among infants in summer. To use their own words: "It is practically the unanimous opinion that the most important factor in procuring good results is intelligent care." In speaking of the poorer results obtained in feeding in summer than in winter, they say: "There seem to be many factors, but consideration of the facts accumulated indicate that heat is the primary factor and that bacteria and their products is a secondary one, except when the contamination is extreme or pathogenic organisms are present." It has been taught that all food should be judged by the amount of heat it can produce, or, in other words, the number of calories it contains. Only a small part of the heat produced is needed to maintain bodily heat in warm weather, and as the body cannot utilize heat as such, it is clearly fallacious to attempt to fix any standard for the number of calories a diet should invariably contain, or to judge a food by the amount of heat it can produce.

Food is valuable only in proportion to the amount of energy the body can realize from it after deducting the amount expended in its digestion and assimilation. According to Rubner, 31 per cent. of the energy of proteids is consumed in their digestion and assimilation and liberated as heat; 12.7 per cent. of the fat and 5.8 per cent. of sugar. Armsby states that the consumption of a small amount of easily digested carbohydrates would result in a relatively small heat production, while a large quantity of proteids would greatly increase the loss of energy in this way. At low temperatures this additional heat production may be an advantage, enabling the well-fed organism to withstand cold better. At high temperatures, on the other hand, this additional heat may become oppressive or even dangerous by adding to the amount of which the organism must dispose. A large consumption of food difficult of digestion renders the man or animal less able to endure hot weather, and presumably more liable to those disorders which result from overheating. Furthermore, proteid foods being those which cause the greatest production of heat, their amount in the dietary should be the minimum necessary for maintenance, if it is desired to limit heat production, their place as a source of energy being supplied by the carbohydrates and fats. In a few words, nearly one-third of the proteid in food is used in

¹ Archives of Pediatrics, December, 1903

preparing the other two-thirds for the body, and when proteids are used to supply energy, they produce about five times as much heat as the quantity of carbohydrates, needed to produce the same amount of energy, would liberate.

There are three ways in which body heat is eliminated from the body: by conduction, due to contact with colder substances; by radiation, as when the heat passes off into the air; by evaporation of perspiration, by which the sensible heat is rendered insensible or changed into latent heat. In the winter and in the cool months of spring and fall, when there is considerable difference between body temperature and air temperature, radiation will carry off the surplus body heat as fast as it is produced, but as the weather becomes warmer the difference between the body temperature and that of the air lessens, and sometimes there is not only no difference between them, but the air temperature is higher than body temperature. In such cases heat excretion by radiation is slow or even impossible, and body temperature would rise above the normal unless some method of getting rid of the heat besides radiation were at hand. To meet this condition Nature has provided that when radiation is insufficient, sweating comes into play and evaporation of perspiration is a most efficient remover of body heat.

When water passes into vapor it absorbs a large amount of heat without raising its temperature. Consider the effect on an infant having on cotton clothing wet with perspiration if it was suddenly taken out where the wind was blowing even moderately on a dry day when the temperature stood very high. That cotton clothing would be cooled down to 62° F.; there would be a vasomotor contraction of the capillaries; the blood would be sent rushing to the distended cells of the lining of the intestines; an increased secretion of mucus would result and a diarrhea would set in. This might take place also in a humid locality when a breeze struck the wet child, for even on humid days a breeze will increase the evaporation and decrease the temperature. The diarrhea will probably respond to treatment if there is no food infection, which there is not likely to be if the infant has been well nourished and has not become depressed. But if the conditions are high heat and also high humidity, it is more than likely that there will be a food infection. The infant has need for very little, if any, food on warm days when the humidity is great. The child is having all that it can do to excrete the heat generated by the process of living and will be overburdened if it is called upon to eliminate the additional heat generated by the digestion of food. Under such depressing conditions there will be a retardation of the digestive process and the undigested food will probably begin to decompose and a poisoning process will be set up.

Sterilization or pasteurization of the food will not prevent this condition, for the intestine is not free from bacteria and they will attack sterile food. If a piece of meat and a solution of sugar are placed in a

warm room, the meat will become putrid and the sugar solution will sour. Both of these changes are brought about by bacteria. The putrid meat would be poisonous, while the sour solution would be harmless. If the meat has been placed in a solution of sugar it will not become putrid, although the sugar solution will sour. This is a homely illustration of what has been proved in the laboratory: that products of the bacterial decomposition of proteids are poisonous and that carbohydrates in the food protect the proteids from attack by bacteria. The bacteria that thrive best on carbohydrates crowd out of existence bacteria that feed on proteids, and their products are mostly harmless. It is useless to expect to find a specific form of bacterial infection or to follow only one plan in dealing with the bacterial problem.

Basing his views upon these facts and upon experience, Pisek formulates the following rules for the management of infants during hot weather: Keep a light woolen garment over the abdomen to prevent sudden chilling of the skin and consequent retention of the heat by suppressing of perspiration. Bathe the infant twice daily to remove fat and salts left by the evaporated sweat. These retard the evaporation of perspiration and thus retard the excretion of heat. Give plenty of cool boiled water to drink, so as to replace water lost as perspiration. Pasteurize food of all well infants so as to retard decomposition. If the weather is close or muggy, or the humidity is high, dilute the food to one-half with boiled water. In very humid weather with high temperature, stop milk altogether and feed gruels till the humid condition is passed. On warm, humid nights do not give milk feedings, because the humidity is higher at night than in the day-time, although the temperature may be lower. Feed gruels or whey, which produce little heat. For diarrhea give castor oil or calomel to eliminate decomposing food. Stop all milk feedings temporarily. If the air is hot but dry, milk feedings may be resumed soon. If there is high humidity, feed gruels or whey to reduce heat production and also to starve out putrefactive bacteria, and very cautiously get back to milk feedings. Provide a circulation of air, as stagnant air soon becomes saturated with watery vapor and no more perspiration can evaporate and absorb heat.

RHINOLOGY AND LARYNGOLOGY.

By D. BRADEN KYLE, M.D.

RHINOLOGY.

Septal Deflections. As was predicted in these pages a year ago, the question of the various operations for septal deflection, after being thoroughly tried out, are settling back to a more sensible basis. The whole object in the correction of septal deflections is to remove sufficient tissue to allow the septum to be placed in the median line, giving equal breathing space to each nostril. No one operation can cover the entire variety of cases, and every nasal surgeon who has had a large operative experience agrees that any method must be modified to suit the individual case. In the submucous operation, so much talked of and written about, there is no question that if the entire cartilaginous and bony septum is removed there will be no further deflection, but why unnecessarily sacrifice tissue? It is with pleasure that I note the tendency toward a more sensible view of this interesting operation, which unquestionably has its place in nasal surgery, but it certainly is not necessary in all cases.

Of the many operations suggested for the correction of septal deflection, much discussion and confusion has been caused by the fact that the author of a method suggested it for a particular variety of deflection; then some operator, having his attention called to this particular method, applies it to some other variety of deflection, the result being unsatisfactory, and hence he condemns the method. There are many methods of operation for the same variety of deflection, no doubt some better than others, but my own experience has been that if any method for any particular deflection is carried out according to the details given by the originator and, as I have said before, applied to the proper deflection, satisfactory results can usually be obtained. In many instances the method is not wrong, but the operator has applied the method to the wrong variety of deflection.

John R. Winslow,¹ of Baltimore, presents a most interesting article on the subject. His conclusions are worthy of repetition.

Modernization rather than abandonment of the older methods is what is needed.

¹ Laryngoscope, October, 1906.

The majority of cases can be satisfactorily treated by short operations under cocaine-adrenalin anesthesia, and this should be employed whenever possible. The use of cocaine admits of exactness in placing a limited number of incisions with adaptable instruments, under visual inspection, in the location where they will be most effective. Success depends more upon thoroughness and exactness in making these primary incisions than any other element.

One of the most valuable contributions of the submucous operators has been the demonstration of how much the patient can stand under cocaine anesthesia. The general surgeon, too, having learned from us the skilled use of this agent, is now showing us its great possibilities. For instance, there has recently been performed upon a patient of mine, under Schleich infiltration anesthesia, removal of the hyoid bone, part of the base of the tongue and of the pharynx, as well as the larynx.

When skilfully applied and carefully guarded by adrenalin, strychnine, or alcohol, strong solutions of cocaine or even the pure powder may be safely used. By selecting our patients with discrimination in regard to their physical and nervous stamina, and employing the semi-recumbent position, much of the supposed toxic effect of cocaine may be avoided. I always prepare my cocaine solution fresh for each person, by dissolving tablets in warm sterile solution of adrenalin $\frac{1}{1000}$, contained in a graduated minim flask, so that the exact quantity used can be determined.

The simple deviated septum operation is practically painless under cocaine anesthesia. In difficult cases, all the preliminary incisions should be made under cocaine, and the painful part (use of forceps, etc.) done under light general anesthesia. Ethyl chloride would seem an ideal anesthetic for this purpose, on account of its safety, rapidity of action, and its ischemic effect upon the nasal mucous membrane. After its use it is necessary for the nose to be plugged, for fear of secondary hemorrhage. Prolonged general anesthesia is now seldom required in these cases.

If we should pursue the standard operations with the same assiduity and pertinacity as the submucous, aiming at improved technique and increased skill, we should obtain in properly selected cases, by these less severe and exhaustive methods, results in no sense inferior to those obtained by the submucous.

The trend of operative improvement should be toward simplification of technique and shortening of duration, rather than toward complexity. All obsolete and unnecessary instruments or maneuvers should be eliminated. In a large percentage of cases the use of forceps, either as a crushing or a compressing instrument, is ineffectual or unnecessary.

Fracture and replacement with the finger is efficient and painless, when the incisions are made completely through the cartilage. Therefore, this, the most painful step of the septal operation, can often be

omitted. In certain cases, incision of the nasal spine with a chisel, either through the nose under cocaine, or by the supralabial method of Harrison Allen, is an efficient substitute for their use.

The use of splints is extremely objectionable and should be abbreviated or eliminated whenever possible. When the primary fracture is thoroughly done, especially if the nasal spine is fractured or incised, splints will be required for but a short time. Having used all varieties of splints, I have latterly employed selvidge-edge, strip-gauze, or Simpson-Bernay's compressed cotton, dusted with bismuth or saturated *in situ* with camphor-menthol solution in albolene, which will remain in the nose several days without becoming foul.

We now have a number of time-tested and successful operations, each one especially adapted to one or more of the infinite variety of deformities. It is a mistake to claim that every operation will correct all varieties. Operations must be selected and adapted to individual deformities, and it is often a difficult matter to decide which operation is best in a given case. I believe that success is as much dependent upon good judgment in this respect, as on marked operative ability; here the tyro fails.

If there be any excuse for specialism in nose and throat work, it is surely in the line of septal orthopedics. To successfully treat these cases, one must possess a special mechanical ingenuity and dexterity in endonasal technique, both in operating and in after-treatment, that can only be acquired by constant practice. It is a specialty within a specialty; one must not only be a specialist, but an expert in this particular line of work.

Quickness in operating develops with experience, and I am sure that, as skill and facility increase, these operations can be made less formidable and more satisfactory.

There is no line of work in which the adage "practice makes perfect" is more applicable than to septal deformities; it is significant that the originators of these operations all claim better results from them than others obtain, and that all operators report their accidents or failures mostly in their early cases. We must moreover become expert in several methods, as we may have to combine one with the other (Douglass-Roe; Roe-Kyle; Douglass-Allen, etc.).

I, for one, am not willing to relinquish operations by which I am able to obtain satisfactory results in suitable cases in five or six minutes' actual operating time, in favor of those requiring from six to ten times that long and much endurance on the part of both patient and operator. Moreover, we will find many more patients who can endure the limited strain of these short operations than the prolonged strain of the submucous.

As to which of these methods have stood the test of time and experience, and which can be discarded as superseded by better methods, each is

entitled to his individual opinion. I venture to assert, however, that the Ash, Douglass, Gleason, and Harrison Allen methods, and the Roe forceps and Kyle saws and splints, will continue to be used in suitable cases, as long as there are septal deviations to be corrected.

Dissatisfaction with the new method is already appearing, and I am sure that in a short time there will be a reaction in favor of the older operations, and that in some cases a better result can be obtained by the old methods than by the new. Although the submucous operation belongs to the most difficult of nasal operations, all agree that it is indispensable, and a method that everyone who aspires to the title of modern nasal surgeon must master.

Winslow states that he is fully aware of the incompleteness, imperfection, and possibly the incorrectness of these views, but this has seemed to him to be a direction toward which our attention might profitably be turned at this time.

In an interesting article J. Price-Brown,¹ of Toronto, warns the nasal surgeon against the dangers of certain septal operations and then increases our perplexity by adding another new method, from which, according to his reports, he has obtained excellent results. He says:

"I cannot believe that when nature has placed a large triangular or quadrangular septal cartilage in every person's nose, separating with a firm wall the one nasal cavity from the other, that it can be removed in a wholesale manner with impunity, a membranous septum being left in its place. Yet this is the ideal operation of today, so ideal that several operators, with marvellous technique, have each removed from fifty to one hundred septal cartilages already. Being skilled men, the large majority of these operations have been successful; that is, the surgeon dissected back the mucous membrane with more or less of the perichondrium from each side and then removed the cartilage without perforation. Still, all the operations of these skilled men have not been without failures. We are told in the *American Journal of Surgery*, June, 1905, that the originator of the modern method had 12 per cent. of permanent perforations, that another operator had 20 per cent., and that yet another, and he one of the most brilliant surgeons of the day, had six perforations out of his first fifteen cases.

"In the *Laryngoscope* for April this year the statement is made that the flap operation is often attended by perforation, and that Killian, one of the most skilful and successful of operators, had declared that the management of the lowest part of the septum is 'most difficult,' also that in the Hajek operation 'the columna is entirely unsupported and may be drawn up into the nose by the contraction of the membranous septum with very noticeable deformity.'

"Yet the submucous operation has been so widely practised, and so

¹ Journal of Laryngology, Rhinology, and Otology, London, July, 1906.

much has been written upon it, that every rhinologist is dreaming of his first ideal operation; and if our established men—surgeons who have been operating for many years—can so frequently, though unintentionally, make successful punches through the septum, what may be expected of the new man, who is simply rubbing his palms together in hopes of the opportunity of displaying his brilliancy?

“The point might be pressed farther. Is it wise to remove the great mass of the septal cartilage in so many successive cases, even when the operation is brilliantly and beautifully done, resulting in perfect healing of the two folds of mucous membrane, back to back? This operation, in its largeness, has only been done during the last two or three years. What will be the effect upon these weakened septa in the long years of the future? For many of these patients will live twenty, thirty, or fifty years yet. We know how weak an organ the septum is, for we frequently find it perforated even without operation, and when perforated it always occasions more or less distress to the patient. How will these membranous septa stand the aridity of the fevers, the typhoids, and the pneumonias of the future? And will there not be a much larger percentage of perforations among the people during future years if every rhinologist considers it his duty to do a submucous resection in every case of severe septal deformity?”

It is in the light of these conditions that Price-Brown ventures to offer still another method of treatment for consideration, one in which the septal cartilage, when in extreme curvature, instead of being removed, can be relieved of all tension, and replaced with perfect healing in the central plane position. If this claim can be sustained, it should be a better operation for the patient than the removal of the cartilage by the submucous resection, no matter how excellently or scientifically this may be accomplished.

His former method, which he practised for years, was with a thick saw, to make two longitudinal cuts from before backward through the septum. These were made obliquely from the convex side, and were about half an inch apart, passing through both mucous membranes, the lower cut being just above the superior maxillary ridge. This diminished the tension of the septum and enabled the operator with finger and spatula to force the central portion, as well as the adjacent margins, to their normal position. It did not, however, remove the central resiliency of the long curvature from before backward. Still, it was his practice to insert at once a pure rubber splint of sufficient thickness to retain the septum in its new position. The rubber being smooth, aseptic, compressible, and incapable of absorbing germs, was allowed to remain within the cavity undisturbed as long as its presence was needed, cleansing being regularly attended to above and below the splint. In these cases good results were always obtained, but they were not perfect and the treatment was too prolonged.

Hence, to secure better and quicker results, he has added to the two cuts already mentioned still another one. That is, to remove the antero-posterior tension, he makes a cross-cut extending beyond the other two cuts, converting the two straight lines into the figure of H. This method he calls the "H operation."

The author draws special attention to the following points: First, that as the curvature of the cartilage from above downward gives it a greater width than it would occupy if it were upright in its normal position, the two longitudinal cuts should be so managed as to remove two long slips of the septal cartilage; and at the same time be made at an oblique angle, so that the cut edges can slide over each other. Second, that the cross-cut of the H should be very decidedly oblique, cutting through both mucous membranes and cartilage with knife or chisel, so that in replacing the segments the posterior central segment of the septum will slide forward over its fellow and the anterior one backward.

It matters little how these cuts are made if the principle upon which they are founded is carried out. The long strips of cartilage might be removed either by drill, swivel-saw, knife, or ordinary saw of unusual thickness, or any improved instrument specially constructed for the purpose. The cross-cut can be made by either chisel or knife. The immediate result of the combined cuts, when made completely through both mucous membranes and cartilage, is that all tension is removed, that two rectangular flaps are made by the H incision, the basic blood supply of each being retained, and that they can with ease be pressed into the normal position, their edges sliding over each other. A single rubber splint is inserted on the convex side.

Treatment of Hay Fever. Each year our journalistic literature is always well supplied with articles on this interesting subject. The various reports show conflicting results, which goes to prove that as yet no definite plan of treatment has been originated. I see no reason to change the views expressed in *PROGRESSIVE MEDICINE* a year ago, namely, that each individual case must be studied as such and careful attention given to the secretions and general condition of the patient. On this scientific basis, and this only, can we expect any definite results.

Koster¹ reports very little success with *Dunbar's serum*. He is more and more convinced that contamination with pollen of the graminæ is still the direct, but not the real, cause of this odd affection. It must be concluded that there is some change in the individual when he has been free until his thirty-fifth year, and then acquires these symptoms after contact with pollen, which disappear after removal from this contact. His attention became directed to the chronic changes of the mucous membranes which are found with so many sufferers of hay fever,

¹ Tydschr. v. Geneesk., May 19, 1906.

the so-called "dry" inflammations of the mucous membranes of the eye, nose, and throat. Contact with pollen produces in healthy people increased production of mucus; the mucus partly envelops the pollen with an impenetrable layer, and, as far as it covers the membrane with an invisible layer, makes it impossible for the pollen to have any influence on the layer of nerves and bloodvessels. This reaction does not take place in the patient with "dry" inflammation; his mucous membranes are or become duly moist, but not mucous. The consequence is that the pollen may exhibit its irritating action. Koster recommends potassium chlorate, which has a soothing action in chronic pharyngitis, as it produces a clear, somewhat sweet mucus. He uses it in the following way: As soon as the irritative symptoms commence or should begin, that is, about the middle of May, one must gargle the throat well with a 3 per cent. solution, then irrigate the nose by pouring this same solution into it with a teaspoon, and when the fluid is snuffed up well, spit it out, and then the eyes are treated with an eye bath. This should be repeated three times a day. During the treatment smoking is not allowed, and it is not advisable to use stimulating drinks, especially alcoholic. The patient should keep away from dust, and should walk very little in the country; when the nose, throat, or eyes itch, menthol should be snuffed up till the irritation has disappeared, also after an attack of sneezing. One has to be careful in not "catching cold," as every affection of the mucous membranes operates in favor of the hay fever. Koster sometimes uses insufflations of 100 to 200 mgr. (1.5 to 3 grains) of potassium chlorate powder in the nasopharyngeal cavity. It may irritate the mucous membrane of the nose and throat, at first, but only for a few minutes, and the next time the patient hardly feels anything. The patients must be carefully instructed not to swallow it, and care should be taken that not too much is reabsorbed, as otherwise nephritis and renal hemorrhage may follow. Children should learn with a 1 per cent. solution of sodium chloride. The sea-shore is excellent when there is a sea-breeze. The trouble is increased by sunshine and a land-breeze. Hay fever can be combated in three ways:

1. By preventing contact of pollen of the graminæ (and most probably of other pollen) with the sensitive person.
2. By making the person immune with serum, as described by Dunbar.
3. By treatment of those mucous membranes on which the pollen acts, so that they have their normal means of defence.

Wolff,¹ is of the opinion that neither *Dunbar's serum*, obtained from animals which have been injected with the toxin derived from pollen, nor Weichardt's serum, from animals feeding on grass at the hay-fever season, and concentrated by a special process, acts as a simple antitoxin, but thinks that they evidently depend upon some complement in the

¹ Wiener klinische-therapeutische Wochenschrift, July 16, 1906.

blood of the affected individual, and this explains their different action with different individuals. In Wolff's opinion, the complete cure of the disease is not to be expected by a hay-fever serum, but it may be expected that it will completely relieve the mildest cases, improve the more severe, and make it possible for the worst cases to reach an immune territory without too great suffering. In practice he has found the powdered serum very serviceable.

The method employed by Schadle is extremely interesting. It is well known that in certain cases of hay fever local applications relieve the local irritation, while in other cases local applications, no matter how bland and non-irritating, seem to act as irritants to the already inflamed mucous membrane. If, however, the chemical reaction between the local solution used and the secretion present produces a non-irritating fluid, then the local treatment may prove beneficial, and I think possibly the report as given below by Schadle may be explained on this basis.

Schadle¹ reports the successful treatment of a patient suffering from hay-fever asthma by the following method: Both antral cavities were irrigated with a warm boric acid solution until the return fluid was clear and perfectly free from sediment. The hypersecretion of the cavities was marked, and it required considerable irrigation to clear them. The sinuses were then freely insufflated with thymol iodide. The same treatment was carried out for five successive days, and after the third day of treatment all the symptoms had disappeared. Further treatment was not required, nor was the environment of the patient changed.

Galvanization of the Pneumogastric for Relief from an Attack of Asthma. Courtade,² in a communication to the Société Médico-chirurgicale, recommended the application of electricity to the lateral cervical region. The positive pole is placed on the neck so as to produce a condition of electrotonus, that is to say, a diminution of the excitability of the nerve. Thus directed the current acts upon the pneumogastric at first, in a centrifugal manner, so as to excite the bronchial and laryngeal muscles; following this it acts centripetally upon the phrenic nerve, and upon the great sympathetic. The excitation of the latter is able to modify the vasomotor activity of the vessels of the medulla oblongata and the respiratory centres. The results were found to be very favorable in essential asthma.

Extirpation of an Hypertrophied Thymus Gland for the Relief of Dyspnea (Thymic Asthma). It is a well-known fact that surgery of the thymus gland is always an exceedingly grave procedure, and reports of the entire extirpation of this gland are exceedingly rare. The results obtained by Ehrhardt³ are certainly remarkable. He has recently performed total extirpation of the thymus gland for the relief of dyspnea with complete success. The case was a young girl, aged fourteen years,

¹ Medical Record, September 8, 1906.

² Bulletin médicale, February 21, 1906.

³ Abstract in Bulletin médicale, February 21, 1906

who was suffering from strong compression of the trachea by the hypertrophied gland. The operation was followed by free respiration, and, what is worthy of special notice, the child did not present any sign of disorder from suppression of the internal secretion of the thymus gland.

Treatment of Hypertrophic and Intumescent Rhinitis. The reduction of thickened nasal mucous membrane by means of the galvanocautery is a questionable procedure. There is no doubt that in the hands of skilful operators satisfactory results can be obtained; however, there are a number of dangers associated with this procedure. In the first place, the scar tissue resulting from a burn is usually excessive and the amount of contraction cannot be controlled. Also, certain individuals show marked systemic symptoms following a burn. There is also more likelihood of middle-ear involvement from the extension of the inflammation. There is no doubt that the excess of tissue in hyperplastic or intumescent rhinitis can be reduced by the galvanocautery; but if this reduction can be obtained without producing so much surface scar, the patient is less likely to have after-complications. The single puncture with a sharp-pointed knife or even linear incision will give as good results and the dangers to the patient are reduced to a minimum. I have seen a number of cases, in which the cautery had been used several years previously, that certainly were in a much worse condition than if the membrane had never been touched. The method advocated by Ingals and Friedberg¹ should certainly be used with great care and, if employed generally and indiscriminately, would unquestionably result in much needless destruction of tissue.

Ingals and Friedberg, with a view to showing the value of the galvanocautery, studied 100 cases, 50 of the hypertrophic and 50 of the intumescent form of rhinitis, in which treatment had been carried sufficiently far to serve as a basis for comparison. They conclude that the galvanocautery, when properly used, offers one of the best, if not the best, methods for treatment of the intumescent and hypertrophic forms of rhinitis. The dangers of middle-ear infection, they believe, have been greatly exaggerated, as not one case in the series and only one among several thousand cauterizations have come under their observation. The liability to adhesion formation is not great, providing sufficient care be taken not to injure the opposite septal mucous membrane, and providing, in cases in which the subsequent swelling is marked, that a probe be passed between the opposing surfaces in four or five days. A 4 per cent. solution of cocaine is sufficient in the vast majority of cases to induce complete local anesthesia; from three to six applications on a cotton-wound, flat applicator being sufficient for the purpose.

As the result of experience, especially in cases of marked intumes-

¹ *Annals of Otolaryngology, Rhinology, and Laryngology*, March, 1906.

cence, they believe that a spray of adrenalin or suprarenalin, grain $\frac{1}{4}$ to the ounce, materially assists in producing anesthesia. The objection that the galvanocautery destroys too much of the mucous membrane does not obtain if the cauterization is linear, as here recommended and if it is done properly, whereby very little mucous membrane is destroyed. Scab and crust formation does not occur any oftener following cauterization than after other nasal operations. In fact, it was noted in but very few instances, and in some of these a change in the spray solution caused a cessation of this trouble. No packing is needed to prevent hemorrhage, and this factor makes the discomfort following the operation very much less than when some other methods are employed. There is very little pain after galvanocauterization of the turbinated bodies.

The Use of Alypin as a Local Anesthetic. The subject of anesthetics is always of interest to the operator. The local anesthetic agents are especially useful in the surgery of the nose and throat, and while cocaine still holds its important place as a local anesthetic, yet a number of new drugs, which are certainly useful in some cases, have been recently employed.

Wendell C. Phillips¹ speaks very favorably of the use of alypin as a local anesthetic for minor operations upon the nose and throat. Alypin (monohydrochloride of benzoyl .1.3; tetramethyldiamino 2; ethylisopropyl alcohol) is described as a white, crystalline powder, easily soluble in water and alcohol, and dissolving very sparingly in ether. Watery solutions have a neutral reaction and can be sterilized by boiling for a short period. It is said to be easily absorbed by mucous membranes and not precipitated by alkaline fluids of the body. Owing to its neutral reaction it does not cause irritation at the site of application. It is also claimed that its anesthetic effect is equal or superior to that of cocaine, and that it has but little poisonous effect, large doses even producing no change in the heart action or respiration. When applied in the eye no mydriasis or disturbance of accommodation results. When applied to membranes it does not produce ischemia, but a slight hyperemia. It is further claimed that it may replace cocaine in all its indications and without systemic effects, and with less danger of secondary hemorrhage after operation. Sterile solutions may be prepared by adding alypin to boiling water, the boiling being continued for about two minutes. The author has employed the drug in a number of cases, in most instances a 4 per cent. solution being used. In all nose operations he also employs adrenalin chloride.

Phillips believes that in alypin we have a drug possessing the power of producing anesthesia of the mucous membranes without any depressing systemic effects. It does not contract or blanch the tissues, and its anesthetic effect is equal and probably superior to that of cocaine.

¹ Laryngoscope, July, 1906.

In the removal of lingual tonsils and similar growths, the fact that it does not contract the tissues is a distinct advantage.

The Maxillary Sinus. Surgery of the accessory cavities has already very definite lines of procedure, yet, of the many methods offered, each year shows some modifications and improvements.

Chevalier Jackson¹ describes an operation which has yielded him the largest percentage of cures, as follows: The anterior two-thirds or all of the middle turbinal is removed. Then the entire inferior turbinal is removed except a long, ridge-like stump. The next step is the enlargement of the normal antral opening all the way down to the floor of the nose. This opening must be of ample size, so that it will remain open for a long time, if not permanently, and must extend to the floor of the nose to afford proper drainage of the antrum. On this depends the success of the operation. Care should be taken to keep back of the nasal duct and if possible avoid wounding it. The naso-antral wall must be removed backward to the posterior limit of the antral cavity, so as to afford perfect drainage without a "pocket" in dorsal decubitus. It is the constant contact of pus that perpetuates degenerative changes in the lining of the walls of the antrum. With this opening a backward inclination of the head, as is natural in *screatus*, permits complete emptying of the antrum. The next step is the removal of sufficient of the anterior wall of the antrum by the buccal route to enable the exploration of the cavity with the finger and thorough removal of diseased tissue. Normal ciliated epithelium must be spared if present, but no diseased tissue should be allowed to remain. The cavity is irrigated with boric acid every alternate day, and repacked through the buccal wound. Iodoform gauze, thoroughly rinsed in weak bichloride solution, to remove the excess of iodoform, is used for the cavity, but plain gauze is knotted to the end so that what lies in the mouth will contain no iodoform. When the cavity is seen to be lined with healthy granulations, or in some cases not until it is epithelialized, the buccal wound is allowed to come together or is stitched, after packing the antral cavity with iodoform gauze, omitting the plain gauze, knot, and plug. This last packing is removed through the nose on the third day. In some cases irrigation through the nose may have to be carried out for a time; in other cases it will not be required. Those who object to the removal of the inferior turbinal may often get very good results by modifying this operation to the extent of biting off only the posterior end of the inferior turbinal with Hartman's conchotome. For making the naso-antral opening Jackson employs a biting forceps especially constructed for the purpose. This part of the work may be done under local anesthesia, with the patient in the erect posture, but he prefers to complete the work at one operation under general anesthesia. For acute sinusitis, unaccompanied by degenerative

¹ Laryngoscope, October, 1906.

change in the mucosa, the intranasal steps of this operation are all that are necessary.

Osteoma of the Ethmoid. H. de Stella¹ was called to examine the nose of a girl, aged seventeen years, who had consulted the ophthalmologist for proptosis with diminution of the visual acuity. de Stella found the left nostril filled with a hard, bony tumor, which pressed against the septum and projected into the nasopharyngeal cavity; behind it was free and attached to the ethmoid. The left naris had been closed for years. He made the diagnosis of osteoma of the ethmoid and considered removal through resection of the upper jaw impossible, so he operated, as Moure, by an incision along the supra-orbital margin and the side of the nose as far as the upper lip, with removal of the nasal bone and the outer wall of the antrum. After the operation the bony walls of the orbit were pressed in, the eye replaced, and the wound entirely sutured. Healing took place in two weeks. The position of the eye was normal, the nose free, and recurrence was not to be expected.

His second case, a boy, aged twenty-one years, was also sent him by the ophthalmologist, who was consulted for exophthalmos and diminution of sight for six months on the left side. A hard, bony tumor was found at the inner side of the orbit, apparently originating from the lacrymal bone. In the nose there were deviation and spur of the septum, but no tumor. In the eye there was advanced retinitis atrophica. The incision was made as in the first case, the bulb pushed outward, and the tumor cut off from the ethmoid. The wound healed quickly.

Lupus of the Nasal Cavity. Lupus of the nasal cavity is a rather rare condition in America. Interesting observations by Mygind² show, however, that the condition is not so rare on the Continent. He gives the results of his examinations of the nasal cavities of 200 patients. These patients had all been under Finsen's care for lupus of the skin, and had been receiving the light treatment. Of the 200 patients examined 57 were males and 143 females. Under the age of fifteen there were 8 males and 10 females; between the fifteenth and nineteenth years there were 14 males and 19 females; between the twentieth and twenty-fourth years, 16 males and 30 females; between the twenty-fifth and twenty-ninth years, 6 males and 25 females; between the thirtieth and thirty-fourth years, 1 male and 13 females; between the thirty-fifth and thirty-ninth years, 3 males and 16 females; between the fortieth and forty-fourth years, 6 males and 10 females; between the forty-fifth and forty-ninth years, 2 males and 7 females; over fifty years, 1 male and 13 females. Out of the 200 patients the nose was involved in 129. The nasal cavities showed either distinct lupus lesions, characteristic cicatrices, or destructive processes caused by previous

¹ Tydschr. v. Geneesk., February 3, 1906.

² Archiv f. Laryngologie und Rhinologie, vol. xvii.

lupus lesions. Of the 129 patients, 36 were male and 93 female. Of the lupus patients examined there were 64.5 per cent. who presented evidence of lupus in the nasal cavities.

Bender, who examined 380 lupus patients, found only 30.3 per cent. of nasal lupus among them; Leloir, out of 312 lupus patients, found 20 per cent. with nasal lupus, and Holin found that over one-half of the 106 patients examined by him had evidences of lupus of the nasal cavities. Pontoppidan found nasal lupus in 40 out of 100 patients. According to the above statistics intranasal lupus occurs more than twice as frequently in women as in men. This was found to be so in the cases examined by Mygind in Finsen's light institute. Among the same 200 patients examined for pharyngeal and laryngeal lupus, it was found that the greater number of cases of lupus of the pharynx occurred in the men and laryngeal lupus in the women. Pharyngeal and laryngeal lupus occurs also more frequently in young adults under the twenty-fifth year than in older people. The fact that lupus involving the mucous membrane of the lower air passages is a much more severe form than that involving the nose, and really shortens life, may be the reason that pharyngeal and laryngeal lupus is not more often seen in older people. Nasal lupus does not materially shorten the life of the patient, and is found just about as frequently in old as in young subjects.

Intranasal lupus, as a rule, is secondary to the skin lesions. In only thirteen of Mygind's cases of intranasal lupus, the skin of the external nose was not affected in any way, but in every case the skin of the face was involved. The intranasal condition is, too, as a rule, not as severe as the skin affection, and may persist for a long period without much destruction of tissue. Primary lupus of the nasal cavities, while extremely rare, does occur, although Moritz Schmidt in his extensive experience has only seen 1 case. In the 129 cases of nasal lupus reported in this paper the nasal involvement was secondary in every case.

The nasal vestibule and the region of the *alæ nasi* is almost always involved. In only 7 of the 129 cases there was no evidence of lupus in the nasal orifices. In a number of cases the *alæ nasi* had been entirely destroyed, causing a good deal of deformity. Lupus nodules were frequently found in the septum, and in a few cases the septum itself was destroyed, causing a sinking and depression of the end of the nose. Cicatrices resulting from the destruction of tissue produce frequent changes in the shape of the nares, consisting frequently in narrowing of the nasal openings. This is produced by a uniform contraction of the cicatricial tissue and cicatrices. Occasionally the nasal opening is entirely closed by the contraction of this scar tissue. The fact that such frequent deformities were found, and comparatively few cases in which lupus nodules were present in the anterior part of the nose, proves that the lupoid process in this part of the nose runs its course very rapidly, and is much more destructive than in other parts of the nasal cavities.

Further, in the nose lupus nodules occur with much greater frequency. The nasal septum is very frequently involved. In only 35 of Mygind's 129 cases was there no evidence of an existing or previous lupoid process of the septum. The lesions are almost always situated on the cartilaginous septum, and practically never attacked the bony septum. This is one of the most important points in the differential diagnosis between this affection and syphilis. In a small number of cases, 24, the lesions on the septum consisted exclusively of lupus nodules; in the remainder of the cases the characteristic scars and perforations were present. The lesions, as a rule, are bilateral. Perforations resulted in 58 of the 129 cases, and as a rule there were no nodules around the edges of the perforations. The perforations are usually situated well anteriorly, and vary in size from small pin-point perforations to a perforation involving the entire quadrangular cartilage. As a rule, they were from 1 to 2 cm. in height.

The mucous membrane of the inferior turbinate showed lupus nodules in 80 cases, but visible scars were only present in 3 cases. This is due to the fact that nodules involving this part of the nasal mucosa may persist for years without breaking down. The middle meatus is only rarely involved, and nodules were only found in the mucous membrane of the middle turbinate in 16 cases. The posterior nares were only found involved in 5 cases, which proves an earlier investigation of the author to be true, that lupus seldom extends directly from the nasal cavities to the mucous membrane of the nasopharynx and pharynx.

Primary Syphilitic Infection in the Nose. James T. Campbell,¹ of Chicago, states that chancre of the nose is one of the rarest of lesions. Intranasal inoculations occur most frequently in the lower and anterior part of the nasal septum, next in frequency on the ala, and then, as in the case he reports, on the inferior turbinated body. The location modifies the chancre's appearance. On the septum it displays a flat, reddish or greenish, fungiform mass, with indurated circumference. The surrounding mucous membrane is, to a greater or less degree, swollen, and there flows from the oftentimes stenosed nostril a bloody, fetid discharge. When the ala is involved the infiltration and induration often causes it to be of a cartilaginous consistency. When the inferior turbinated body is primarily inoculated, the appearance resembles, mostly, a severe localized influenza, or a fibrinous or diphtheritic rhinitis. Usually the submaxillary, sublingual, and preauricular glands early show marked indolent swelling. Characteristic of this infection is an aggravated general febrile disturbance, malaise, and depression of spirits. The chancre may be mistaken for an abscess of, or injury to, the septum; for a furuncle, to which for a time it is not dissimilar; for vaccine inoculation; for tuberculous ulceration; for malignant disease.

¹ Jour. Amer. Med. Assoc., May 5, 1906,

The history of the case reported is as follows: On October 19, 1905, a surgeon in perfect health, circumcised a patient, on whose prepuce was a large, indurated chancre. On December 16, nearly two months later, he first noticed stuffiness of the right nostril and headache from the brow across the vertex to the occiput. This was accompanied by malaise, anorexia, chilly sensations, and constipation, a condition from which he never before had suffered. For a period of two weeks his temperature ranged from 100 to 100.2° F. He had worked very hard for a few weeks prior to December 16, and attributed his condition to overwork and a grip-like attack. When first seen on December 28 there was superficial necrosis of the mucous membrane, covering the anterior end of the right inferior turbinated body; the fibrinous membrane, when raised, revealed an ulcerating, bleeding surface. Neither suprarenal 1 to 1000 nor 10 per cent. cocaine solution caused any appreciable blanching or shrinking of the turbinated body. Lacrymation was present on the right side and one gland below the angle of the right jaw was enlarged and tender. The condition resembled fibrinous rhinitis, but it was limited to the inferior turbinated body and there was no ichorous discharge from the nostril. The swelling practically occluded the nostril, which was narrow on account of septal deviation, the result of traumatism in childhood. The treatment employed was a cleansing alkaline spray followed by sprays of peroxide of hydrogen and lime-water.

On January 8, 1906, eighty days after the probable inoculation, a macular rash appeared on the abdomen. Four days later a positive diagnosis of syphilis was made. The "lean-ham" macular and papular rash, more marked on his chest than abdomen, covered practically the whole body with the exception of the exposed portions of the head and hands. There were papules at the base of the uvula, but no soreness or congestion of the fauces and no glandular enlargement or soreness, excepting the before-mentioned submaxillary gland. Disappearance of the fibrinous membrane and healing of the ulceration took place under the simple sprays, before constitutional symptoms appeared. Coincident with the appearance of the rash, the headache ceased and the general feeling of well-being began. A diagnosis of syphilis being made, inunctions of mercurial ointment, one drachm, at bedtime were begun, and after six rubbings all evidence of the disease had disappeared.

J. D. Rolleston¹ also reports a case which came under his observation, his patient being a man, aged twenty-eight years, believed to be suffering from nasal diphtheria. He had had diphtheria fourteen years before. One month before his first visit his nose became sore and began to swell. The right ala was thickened and tender, and lined with a membranous deposit, from which on pressure there exuded a serous fluid. The left submaxillary and sternomastoid glands were considerably enlarged and

¹ Lancet, London, June 16, 1906.

slightly tender. The throat appeared normal. There was on the chest and abdomen a polymorphic rash, without pruritus. The nose was obstructed, and there was considerable right frontal headache. There was a very slight rise of temperature. Smears and cultures revealed no diphtheria bacilli. A diagnosis was, therefore, made of chancre from the objective appearance alone. The patient was placed on hydrargyrum cum creta, 2 grains three times a day, and the lotio nigra was freely applied to the nose. The beneficial effects of this plan of treatment were soon apparent, and in ten days the nose was nearly well. The other symptoms disappeared more slowly.

The Origin of Mucous Polyps of the Posterior Nares. Killian¹ states that mucous polyps are generally unilateral and single, markedly pyriform, their large end being situated in the nasopharynx and their long, thin pedicle deeply buried in the nose; the growth is usually cystic, liable to inflammation and gangrene. Rupture of the cysts and spontaneous elimination of the growth have been observed. Recurrence after removal is rare. The difficulty of determining their seat of origin is discussed. The author has frequently noticed the extraordinary size of the maxillary antral opening accompanying these polyps; this has led him to suspect that the pedicles had their origin in the antrum. Close observation of seven cases allowed him to confirm this view. It is Killian's opinion that these polyps spring from the antral mucosa, make their way through the ostium into the nasal fossa, and pass in the direction of least resistance through the choanæ into the nasopharynx. In like manner the sphenoidal and ethmoidal sinuses occasionally contribute to the production of this form of growth. The theory advanced by Killian supports the views written by Bosworth several years ago. Bosworth believed that many of the nasal polyps originated from the mucous membrane of the accessory sinuses.

Bacteriology of a "Common Cold." Considerable work has been done on the subject of nasal bacteria and conflicting deductions have been drawn by equally eminent bacteriologists. The different results obtained probably can be explained by the fact that widely different methods were pursued. To make satisfactory deductions from a bacteriological study of the nasal secretions necessitates extensive investigation not only in diseased but in healthy individuals as well. For example, from a study of the secretions of an ordinary cold or coryza, the mere fact of the presence of certain bacteria would not prove their relation as an etiological factor; such bacteria may be present in health, as was shown by my own² investigations.

C. H. Benham³ investigated the bacteriology of mild cases of common cold, the usual symptoms being sore throat, sneezing, malaise, headache,

¹ *Annales des maladies de l'oreille, du larynx, du nez et du pharynx*, May, 1906.

² *Jour. Amer. Med. Assoc.*, June 10, 1899.

³ *British Medical Journal*, May 5, 1906.

and general muscular pains. Swabs were taken from the nose and throat, from which cultures were made on serum agar, and subcultures on nasgar. Diphtheroid organisms were found in 20 out of 21 cases; cocci negative to Gram's stain (*Micrococcus catarrhalis*), 10 cases; Pfeiffer's bacillus (influenza), 2 cases. The main feature of the series is the almost constant occurrence of a diphtheroid bacillus. Benham sums up his conclusions as follows: This diphtheroid organism conformed to the description of Cautley's bacillus, found by him in cases of common cold. It gave reactions in carbohydrate media which serve to differentiate it from diphtheria on the one hand and the xerosis and Hofmann bacillus on the other. The question of the exact symptoms, if any, caused by the diphtheroid bacillus and the *Micrococcus catarrhalis*, respectively, cannot be said to be settled. The author suggests the name *Bacillus septus* for this diphtheroid bacillus.

Occurrence of Meningococci in the Nasal Cavities. Goodwin and Sholly¹ isolated meningococci from the nasal mucus in 50 per cent. of meningitis patients during the first two weeks of the disease, and from about 10 per cent. of the people most closely in contact with them. They were frequently present in enormous numbers. Two cultures isolated from normal students were like meningococci culturally and in their pathogenicity, but did not have the same specific agglutinins. The authors believe that the finding of meningococci in great numbers in the nasal mucus of a large proportion of the patients and of those caring for them, and the absence of meningococci from the nasal mucus of a large number of normal persons examined, would strongly indicate the necessity of isolating cases of epidemic cerebrospinal meningitis, at least during the early weeks of the disease.

The Use of Sheet Paraffin in Lesions of the Nose. Moraweck and Hall² recommend the use of intranasal paraffin splints as a means of preventing postnasal adhesions following operation either with the cautery or knife. These splints can be readily molded the desired size and completely and easily sterilized. After cautery work, which is practically all confined to the inferior turbinate bone, one of these sheet splints is applied over the full length of the burn, care being taken not to push it too far back. The first splint is left on for four or five days, the patient reporting each day, when the area can be cleansed without removing the splint. On the fifth day the splints are removed, the site of operation thoroughly cleansed, and new splints inserted. These splints should be left in until the mucous membrane heals. After submucous resection of the septum, the Bernay splints are used for the first forty-eight hours, after which they are removed, and the paraffin, cut in the shape of the Bernay splints but slightly longer, are inserted. These splints are introduced one on

¹ Journal of Infectious Diseases, Chicago, February, 1906.

² Jour. Amer. Med. Assoc., vol. xlv, No. 8.

each side, and are held in place by a little gauze packing, which is removed as often as it is soiled. After turbinectomy gauze tampon packing is applied immediately as the only safeguard against hemorrhage. The packing is removed in twenty-four to forty-eight hours, and if the nose be very narrow, or if there seems to be any chance of the post-operative swelling bringing the raw surface in contact with the septum, a paraffin splint is inserted as wide as the nares will admit. In these cases the most extensive and troublesome adhesions take place; hence it is important to allow the splints to remain in position till the wound has thoroughly healed. In septal deformities, spurs, and ridges, especially when a submucous operation is performed, the paraffin splint is inserted, as it holds the flaps of the membrane down in position.

Nasal Hemorrhage. The efficacy of adrenalin in hemorrhage is beyond question, but the uncertainty of its physiological action still renders it a rather questionable drug, especially when used internally. The treatment of nasal hemorrhage will depend, first, upon whether it is simple epistaxis, or whether it is nasal hemorrhage due to trauma, surgical or accidental; also whether the hemorrhage occurs in children or in adults. The first procedure should always be to locate the bleeding point, then by pressure, torsion, or the use of local astringents the bleeding may be controlled. By locating the bleeding point the precaution, which is extremely necessary, can be taken of not occluding the nasal cavity, thereby preventing the danger of infection of the accessory cavities or involvement of the middle ear.

Henry Jones Mulford,¹ of Buffalo, recommends the subcutaneous injection of adrenalin extract in through the arterial supply at the nearest accessible point to the bleeding area. When practicable, he makes the injection directly into the artery supplying the part, otherwise it may be injected into the tissue closely adjacent to the artery. He states that the result is marvellous. The in-going arterial current sweeps the solution directly into the leaking area, all the vessels of the part becoming constricted, and the hemorrhage ceases almost at once. Three cases are reported, with a diagram showing the point for injection. References are made as to the routes by which hemorrhages into the pharynx and pharyngeal structures may be reached, and the suggestion is made that this method be employed in hemorrhages in any region of the body.

Congenital Complete Osseous Atresia of the Right Nasal Fossa. Ricardo Botey² reports the case of a young woman, aged eighteen years, who had suffered from nasal obstruction since birth, worse on the right side, and as a result had always been a mouth breather. During infancy she suffered considerably from malnutrition owing to her inability to suckle. In childhood she was the subject of nightmare and attacks of suffo-

¹ American Medicine, December 23, 1905.

² Annales des mal. de l'oreille, du larynx, du nez, et du pharynx, April, 1906.

cation. Six years previously a surgeon applied the galvanocautery to the left fossa, which somewhat improved the breathing. When first seen by Botey her nose was sunken and the ascending processes of the maxillæ were thick and prominent. There were hyperostoses over the frontal eminence, above the supra-orbital arches, and on both tibiæ. Her teeth were very irregular, defective in number, and misshapen; Hutchinson's type was present. Anterior rhinoscopy revealed the right nasal fossa completely occluded at the bottom of the vestibule with material of stony hardness, and on the left side a thickening of the base of the septum, with marked bony overgrowth of the inferior turbinated bodies. Posterior rhinoscopy showed complete blocking of the right choana and slight atresia of the left. Subjective symptoms consisted of neuralgic pains about the right frontal and peri-orbital regions, also in the tibiæ at night. The mother had had three abortions, and two children died in infancy. A diagnosis of hereditary syphilis was made, chiefly evidenced in this case by hyperostoses of the cranium, face, outer walls of the nasal fossæ, septum, basilar process, and inferior surface of the body of the sphenoid. Under chloroform anesthesia the obstructing bony deposits were removed with chisel and gouge. Considerable difficulty was experienced in clearing the right fossa. After rendering the nasal passages permeable, a flattened tin cone was worn in the right one and lavage ordered. After ten days the cone was removed and granulations were touched with chromic acid. Iodides of the alkalies were administered internally. Seven weeks after the operation the patient was cured, the nasal fossæ being perfectly patent; the exostoses had diminished in size, and the neuralgic pains disappeared. Hearing and smell, which had both been impaired, were considerably improved.

LARYNGOLOGY.

Some Unusual Manifestations of Syphilis in the Upper Air Passages. It has been my experience, in observing syphilitic manifestations, especially the secondary and tertiary forms, of the mucous membrane of the upper air passages, that the disease when manifested in these structures shows many peculiar phenomena, such as edemas, irregular ulceration and enlargements, and subject to the greatest variations.

Sir Felix Semon¹ reports 4 very interesting cases of syphilis of the upper air passages. The first case is of exceptional interest, being one of precocious tertiary syphilis of the throat and tongue of malignant type, which the author describes as follows:

"A year ago the patient got a hard chancre. It had only just appeared when his doctor saw him. He put him on full doses of mercury at once.

¹ Brit. Med. Jour., January 13, 1906.

None of the ordinary secondary symptoms ever appeared, but the patient got a tremendously swollen throat and tongue, and was badly salivated, ropes of saliva pouring out of his mouth. The soft palate became edematous, the tonsils, on each of which a large ulcer appeared, almost met in the middle, and the patient was very ill generally. The medical attendant considered the phenomena as mercurial. Mercury being left off, the ulceration gradually improved, the salivation diminished, and the patient went away to recoup, but returned with his throat again deeply ulcerated.

"In consultation with a specialist the affection was considered to be of the nature of secondary syphilis; a return to mercury was advised and practised, with the result that the ulceration, as on the first occasion, grew rapidly worse, and the patient became very ill. Mercury was again abandoned, and the patient was treated with 'ordinary throat applications.' Temporary improvement occurred, but a month or so afterward fresh ulceration broke out in the throat. On renewed consultation mercury was again advocated and used, with exactly the same result as previously, namely, that the ulceration immediately became much worse, and that the patient was again very ill. Mercury being discontinued, he very slowly and gradually recovered, and was then sent to a great authority on syphilis, who, it was stated, took an intermediate view between syphilis and mercurial ulceration, and considered the former to belong to the phagedenic type. He advised the use of iodide of potassium, which, however, the patient was 'unable to take in ordinary doses.' The physician had evidently on each occasion, when, either on his own initiative or following the advice of his consultants, he had tried antisppecific remedies, particularly mercury, been so much frightened by the extreme violence of the resulting local symptoms and their bad effect upon the general health of his patient, that he had become firmly convinced that the ulceration was of an exclusively mercurial character, and although he laid the case with the greatest fairness before me, it was quite obvious that his own conviction had become so firmly established that no arguments would easily shake it.

"The patient was a pale, unhealthy-looking man, evidently in pain, whose speech was guttural and indistinct, his frequent endeavors at swallowing the saliva, which was constantly produced in large quantities, being accompanied by signs of great distress. On examination I found the following condition: There was extensive scarring owing to destructive ulceration of the mucous membrane of the palate and fauces, resulting in adhesions, on the one hand, between the soft palate and the posterior wall of the throat, and, on the other, of the pillars of the fauces with the sides of the tongue. The uvula was entirely destroyed, and there were two perforations—a large one above, a smaller one below—in the middle line, the larger one of which represented the only communication between the nasopharyngeal and oral cavity. The tongue showed

evidence of old ulceration and was fissured; the epiglottis was partially thickened, more particularly on the right side, and on this part, as well as on the sides of the fauces, there was still some active superficial ulceration. The interior of the larynx was free. There was no disease in the nose, the cervical glands were hardly enlarged at all, and there was no skin eruption. From the appearance described there was no doubt in my mind that the affection was of a purely syphilitic character, tertiary in nature, although appearing at an unusually early time, and revealing a most unusual idiosyncrasy on the part of the patient against antispecific remedies, particularly against mercury." On the advice of Semon the patient was sent to Aix-la-Chapelle.

"The opinion of the physician at Aix-la-Chapelle, taken quite independently of me, entirely coincided with my own. He considered the case one of precocious malignant tertiary syphilis, two instances of which affecting the nose he had previously observed himself. He at first tried to treat the patient with iodipine preparations, and made four injections of 25 per cent. iodipine, each containing $\frac{1}{2}$ ounce of the drug, this remedy being chosen because, in the experience of my friend at Aix, this form of iodine is equally mild and efficacious. The result was no more successful than had been the mercury and iodine treatment at home. On the day after the last injection the patient got a painful swelling of the tongue. The tongue itself, as well as the soft palate, became covered with a dirty yellowish deposit in the area where previously simple erosions had been present. This condition got daily worse, and ultimately the entire affected region of mucous membrane became changed into a mass of rather deep and intensely painful ulcers, the general health at the same time deteriorating rapidly. The ulcers were painted with a 10 per cent. solution of nitric acid. Under this treatment they became cleaner, but showed no tendency to heal. From this result of the iodipine treatment the Aix physician became even more convinced than he had been before that he had to deal with a case of malignant syphilis, as in such cases in his experience the inefficiency of mercury and iodine preparations is quite characteristic. The present case, additionally, he stated, belonged to a rare variety which he had previously observed, and which is characterized by a tuberculin-like effect of iodine preparations. In such cases the reaction, which ordinarily is quite insignificant, manifests itself by a furious inflammation. This very reaction, in his opinion, made it even more certain that we had to deal with a case of lues, inasmuch as, although the mercury may produce ulcerative lesions, such have never been observed under the administration of iodine preparations, often though they be administered, to non-syphilitic persons.

"Acting upon this opinion *Zittmann's sarsaparilla decoction* was prescribed for the patient, with immediate and brilliant results. For twenty-six days he daily took in the morning 7 ounces of the stronger *Zittmann's decoction*, and in the evening 7 ounces of the weaker decoc-

tion. This was followed for ten days by *Kober's*¹ *sarsaparilla decoction*, and finally he took the two Zittmann preparations for another fortnight. Under this treatment his general health improved from day to day, the ulcers cicatrized in the most desirable manner, and ultimately were replaced by a solid scar. The patient's articulation became much more distinct, he could eat without difficulty and pain, and during the whole time hardly ever suffered from diarrhea. He was discharged with the advice to discontinue for a time all treatment. When I saw him on his return I found a most pleasing improvement; a dense cicatrix united the remnant of the soft palate with the lateral wall of the pharynx down to the level of the epiglottis. In its midst there was one sharp-cut perforation, and the uvula, as already stated, had completely perished. There was no active ulceration in the pharynx and the larynx was normal. The patient's general appearance and articulation were infinitely better than before he went to Aix. Since then, so far as I know, he has remained perfectly well."

The other 3 cases recorded are: (1) Tertiary syphilis of larynx and trachea, followed by isolated tertiary syphilis of the nasopharyngeal cavity. (2) Early fibroid infiltration of pharynx and larynx in a case of obstinate recurring secondary syphilis. (3) Tertiary syphilis of the larynx manifested particularly by periodical inflammation, with production of ephemeral papillomatous excrescences. This last case, Semon says, is without exception, the most unusual instance of syphilis in the upper air passages which he has ever met. Whatever the causes were which repeatedly produced new growths—which almost completely filled the patient's larynx, then made them disappear, leaving the organ but little disfigured, and then again and again produced fresh crops, to be followed by similar disappearance—he is quite unable to say.

In conclusion Semon says: "The simple narrative I have given illustrates, I think, better than any elaborate commentaries how little one single form of antisypilitic treatment can claim to be universally successful in all cases. In the great majority of my own cases of syphilis of the upper air passages methodical inunction treatment has been most successful, and I trust this more than any other method. Yet you have heard that in 2 out of these 4 cases it failed. The therapeutic lesson to be derived from the experiences gained in these 4 cases, it

¹ The formula of this preparation is the following: Place 1 kg. of sarsaparilla root in coarse powder in a closed vessel with 4 kg. of distilled water, and set aside for three hours, occasionally stirring; heat and keep boiling for one hour, then press out. Repeat this once more. Evaporate the combined decoctions until there remains 1 liter (quart), mix well with an equal volume of alcohol (90 per cent.), wash out the residue with boiling alcohol (90 per cent.) $\frac{1}{2}$ liter, strain through flannel and filter, evaporate to $\frac{1}{2}$ liter or less. Establish the quantity of sarsaparilla and sarsaponia according to the method of v. Schulz-Christophson, and adjust the strength of the finished product either by evaporating or by adding distilled water, so that it shall contain 2 per cent. of the above glucosides.

seems to me, is that, as in diagnosis so in the treatment of syphilis, it must be our aim to individualize when the ordinary canons show themselves insufficient to cope with the particular case, and not to insist on preconceived notions of any kind."

Preliminary Injections of Antistreptococcic Serum in Mouth Operations. Charles Willems,¹ at the last French Congress of Surgery, reported the results obtained by the use of preventive injections of antistreptococcic serum prior to surgical operations within the mouth. These injections were first recommended by Professor Denys, and have also been practised by Lawers, de Coustrai, and Goris, of Brussels, who, it is claimed, obtained remarkable results from them. Willems adopted this method especially in uranostaphylorrhaphy. He found that instead of having the usual gray-looking, unhealthy wound following the operation, the edges were absolutely clean, and the wound remained perfectly clear and red without the slightest exudation. A still more striking result was the absence of deep infection in the line of reunion. There was also a larger proportion of cases of complete union from the first operation. The great advantage of these injections was that subsequent treatment was unnecessary and the repose of the parts facilitated the cure. As regards the dosage, M. Denys recommends 30 to 40 c.c. as the preventive dose; M. Willems does not go beyond 20 c.c. the night before, and he often gives a second injection of the same quantity at the termination of the operation. The only inconvenience of the injection is that it sometimes causes a little fever or tachycardia, and in a few days, sometimes sooner, it may cause an eruption of urticaria.

Calculus of the Submaxillary Gland. Calculi are liable to form within any secreting or excreting gland. Certain glands, however, seem to be almost exempt. Few cases are reported of calculus of the submaxillary gland. Personally I have only seen two cases in which such condition existed.

G. Alexandre² also states that cases of this nature are not common. His patient was a woman, aged fifty years, and when first seen by the writer she stated that for the last thirteen or fourteen years she had had an enlargement under the left side of the lower jaw. The size of this tumor had gradually increased, although it varied from time to time. There was no discoloration of the tissues. Palpation discovered an indurated and resistant mass movable under the skin and having the form of the submaxillary gland. For years the patient had no pain, but for the last six months she had suffered from this growth. There was no difficulty on mastication and nothing abnormal was noted on examination of the mouth. The gland was successfully removed. On section a calculus as large as a big pea was found. Chemical examina-

¹ Journal des sciences médicales de Lille, February 3, 1906.

² Revue de chirurgie, May 10, 1906.

tion showed it to be composed of water, carbonate of lime, phosphate of lime, and organic matter. Bacteriological examination resulted in the growth of a pure culture of leptothrix. Alexandre states that this microörganism is always found in the mouth.

Treatment of Leukoplasia, or White Patches of Mucous Membranes. Millian¹ regards leukoplasia as a symptom rather than a disease, and includes under this title all white patches of mucous membranes of a persistent character. This lesion especially selects the region of the tongue and the mouth for its manifestations, but may appear upon any mucous surface. It may be smooth, or attended by the development of tubercles, papules, erosions, ulcerations, or sclerosis. These may be primary or secondary. The former may attend congenital, symmetrical keratosis, papilloma, and squamous epithelioma. The secondary manifestations are met with also in congenital, symmetrical keratosis, and in lichen planus, erythematous lupus, hydroa, in tobacco users and glassblowers, in dyspepsia (Brocq), and in syphilis (both primary and tertiary). He doubts the existence of so-called idiopathic leukoplasia, which he regards as identical with syphilis. In at least 80 per cent. of the cases this diagnosis can be confirmed by the history. In rare instances the lesion from the beginning is epitheliomatous; there are also cases in which the disturbance in the growth of the horny layer by the intrusion of epidermic cells initiates the morbid process which terminates in malignancy.

As regards the treatment of leukoplasia, after eliminating from consideration all the other affections presenting this lesion (epithelioma, lichen planus, hydroa, etc.), which have their own appropriate therapeutics, there is left a group which is syphilitic, either acknowledged or suspected. The general treatment, therefore, will be antisiphilitic. Potassium iodide, however, is of no use; mercury in some form is the efficient remedy. The treatment must extend over many months, as the disease is very chronic. At least a six months' course is required, and this may be kept up for two or three years in order to prevent relapses. Gray oil and calomel are the only forms of mercury which permit a sufficiently long administration, but their effects should be very closely watched for the first appearance of mercurialism. At the least sign of intoxication, the insoluble salts must be discontinued and soluble forms substituted, so as not to lose the advantage of the continued treatment. These remedies are given subcutaneously. At the end of three months the patient is allowed to rest for four weeks, and then another series of injections is begun. By this means the ulcerations are healed, the deep lesions (sclerosis and hypertrophy of the tongue, etc.) become more superficial, and the tongue more supple. The lesions diminish in extent, but more sclerotic patches may still persist, which the antisiphilitic

¹ Bulletin médicale, May 5, 1906.

treatment is unable to remove. In such cases the question of surgical intervention may be considered. The thermocautery may be applied, as advised by Gaucher, to the patches, or they may be dissected off with the bistoury as suggested by Le Denta. In the latter case the entire thickness of the mucous membrane should be removed, or the patch may be reproduced. In ordinary cases, the only local treatment required is protection from irritants, such as strong dentifrices or caustic applications. The mouth and teeth must be kept clean by gargles and the use of the tooth-brush. Alcohol and tobacco in all forms are strictly forbidden.

Nasopharyngeal Growths. When a growth of any considerable size exists in the nasopharynx, the surgical procedure should consist of complete anesthesia, and thorough removal of the growth, operating through the mouth. If any severe bleeding should occur, the patient being completely under the operator's control, the bleeding can be arrested, even if ligation of a large vessel is necessitated.

Kuhn¹ describes a method of removing nasopharyngeal growths which he has been led to believe, by the results of his own experience, will enable surgeons to overcome to a considerable extent the difficulties of this operation. The work of the operator is impeded by the situation and anatomical relations of the tumor, and deliberate and careful action, so necessary for radical removal of the disease, is rendered very difficult by free bleeding and incomplete anesthesia. Except in cases of very small growth it is not easy to decide which is the least unsatisfactory of the three methods that have been devised. The nasal method, the author points out, affords insufficient room; the maxillary method, as in Langenbeck's operation, is objectionable on the score of mutilation and of the risk of facial paralysis; and in the oral method the troubles in arresting hemorrhage and maintaining continuous and efficient anesthesia are most marked. Almost exclusive preference is given to the last of these methods. Inspection of a skull, it is held, should at once indicate that the cranial base is more readily accessible by the mouth than by any other way; that the oral operation is likely to be less severe than others, and that the wide, natural cleft between the maxillæ and the mandible allows of the freest possible approach to a large sphenopalatine growth. For the successful practice of this method, however, two conditions are necessary: the mouth must be opened as widely as possible and kept so during the operation, and the communication of the oral cavity with the air passages and with the alimentary canal must be temporarily suppressed, so that no blood can pass into the larynx and vomiting can be prevented. The latter condition the author meets by peroral intubation of the glottis and by thorough packing of the pharyngeal cavity. The mouth having thus been rendered a freely accessible

¹ Zentralbl. f. Chir., 1906, No. 9.

field of operation, the soft palate and the mucous membrane and periosteum of the hard palate are incised in the middle line, and the horizontal portion of the palate bone and as much as may be required of the palatine process of the maxilla are removed. In this way, it is asserted, sufficiently free access is afforded to the upper part of the nasopalatine cavity, so that any tumor therein situated can be thoroughly explored and eradicated. Peroral intubation Kuhn has found useful also in cases in which it was found necessary to practice more extensive operations for the removal of large nasopharyngeal sarcomata.

Sublingual Abscess. The report given below confirms what I have taught for years, namely, that if the tonsil should be removed it should be done thoroughly and at once, thereby subjecting the patient to the danger of infection only once. When done piecemeal and at numerous sittings the danger of infection is increased especially when operating on an inflamed surface.

M. Dubar,¹ of Paris, reports a case of sublingual abscess of tonsillar origin and states that it was the first one he had ever seen. It was situated immediately above the hyoid bone, and followed removal of the tonsils by *morcellement* in four sittings. The patient was an elderly woman who had been a street hawker. Her vocal apparatus seemed to show the effects of her occupation, but her general health was good. Antiseptics were used freely during the period covered by the operative procedures, but evidently they fell short of their desired effect. The abscess was large, containing about a tumblerful of pus. It was evacuated by a median incision two inches long, extending backward from the point of the chin.

Edema of the Pharynx. Owing to the peculiar lymphatic and blood supply of the pharynx, interference with the circulation of any of the viscera in which the return circulation is interfered with is early manifested in these vessels, usually as a passive or cyanotic congestion, with subsequent slight edema. It is not necessarily a rare condition.

Jacob E. Schadle² describes a case of edema of the pharynx associated with acute nephritis. The patient was a man, aged seventy years, in whom an attack of influenzal bronchitis was followed by tonsillitis. When the tonsillitis subsided a marked swelling of the pharynx occurred, with enlargement of the cervical glands. Up to this time, the urine had been normal in amount and presented no unusual appearance, being frequently examined. The swelling would completely disappear and then return again with the occurrence of a chill and fever, the condition recurring a number of times. Schadle first saw the man during the stage of subsidence and found no edema or evidence of suppuration, though there was slight internal infiltration and the glands were very much

¹ Progrès médicale, February 3, 1906.

² Laryngoscope, February, 1906.

swollen. Two days later the symptoms again became quite alarming. Schadle gives the following description of the condition:

"The left side of the pharynx was very much swollen and resistently resilient to touch or pressure, while the lymphatic glands of the neck on the same side were greatly enlarged and painful on pressure. A careful examination of the throat with the finger showed the existence of a tumor situated in the region of the pharynx behind the posterior pillar on the left side, extending downward toward the larynx and across anteriorly toward the base of the tongue and immediately below the inferior margin of the tonsil. Laryngoscopic inspection revealed the tumefaction extending laterally beyond the median line toward the right side of the throat. This condition obstructed to a greater or less degree the function of respiration. Severe vomiting and retching were present. The larynx itself was seen to be normal in appearance, hardly as much as hyperemic."

Schadle concluded that the diagnosis was either simple edema or deep-seated pus. Deep linear incisions were made into the pharyngeal tumor. No pus was present; but a serous fluid issued from the incisions and gave relief to the symptoms. Examination of the urine at this time showed a large amount of albumin and also casts. A diagnosis of edema was made and additional incisions were made to prevent a recurrence of the serious throat symptoms. Under treatment directed to the kidneys, recovery gradually took place, without pus appearing in the throat either internally or externally. The edema of the pharynx and the glandular involvement of the neck disappeared and did not return again as improvement of the kidneys progressed.

Chloride of Sodium in the Treatment of Chronic Pharyngitis. The observations made by Chaveau serve to confirm the views advanced by me that the chemical reaction of the saliva is an excellent guide in diagnosis and therapeutics. The reaction of the salivary secretions will enable the investigator to determine the absence, presence, or excess of any normal constituents, or the presence of abnormal ones. In cases similar to those mentioned by Chaveau, in which the sodium chloride was in excess, if the reaction had been changed from sodium to potassium, although still remaining alkaline, equally good results could have been obtained.

C. Chauveau¹ has made some most interesting observations in regard to the influence of the chlorides on the condition of the pharyngeal and nasal mucous membranes. He noted the fact that certain forms of chronic pharyngitis characterized by dryness of the mucous membrane and lack of normal secretion were accompanied by a deficient quantity of sodium chloride in the urine. In contrast to this, he observed that cases of pharyngitis of the type known as hypertrophic, with hyper-

¹ New Orleans Medical and Surgical Journal, March, 1906.

secretion and congestion, were associated with an excessive quantity of chloride in the urine. The former class of cases is found to be greatly benefited and even cured by subjecting the patient to a salty diet and the local application of sodium chloride. In the latter type equally good results are obtained by prohibiting the use of salty food, and thereby diminishing the excretion of salines in the urine. The author substantiates his claims for this method of treatment by a series of clinical cases in which excellent results were obtained without other additional treatment. The forms of pharyngitis thus treated are very rebellious to the usual methods of treatment in use and the dietary regime should always be given due attention. Mention is also made of atrophic rhinitis being favorably modified by the same treatment.

Vincent's Angina. An extensive study of Vincent's angina leads W. Eichmeyer¹ to formulate the following conclusions: (1) There are two varieties—a superficial type limited to the epithelium, and a deeper process associated with membrane formation and ulceration. The membrane consists of necrotic tissue masses and numerous fusiform bacilli, and spirochetæ are present in pure culture. (2) The relation between this angina and ulcerative stomatitis is noted in the clinical, pathological, and bacteriological conditions. The pressure of the teeth against the gums and oral mucous membrane explains the deep necrosis occurring always in the stomatitis. (3) The angina begins primarily as an atypically placed stomatitis, though it may be combined with a typical ulcerative stomatitis, and in some few cases the tonsillar process has even been traced to a typical occurrence in the mouth cavity proper. (4) No definite decisions can be made regarding the bacteria of the disease. The fusiform bacilli are the producers of the characteristic symptom complex, but their relation to pyogenic organisms is not clear. The spirochetæ are probably unimportant parasites. (5) The remarkable similarity to noma, clinically, pathologically, and bacteriologically, leads to the supposition of a close relation between it and necrotic ulcerative angina. (6) Diphtheria must be differential from Plaut's or Vincent's angina; the absence of diphtheria organisms is the deciding point; the two may coexist.²

A Rare Case of Presumably Congenital Luxation of the Arytenoid Cartilage. P. Tetens Hald,³ of Copenhagen, discusses luxations of the arytenoid cartilage and reports the following interesting case: The patient was a girl, aged fourteen years, with a good family history. She had been hoarse since birth, and the hoarseness had become a little more pronounced only after scarlatina in her childhood. The patient had never suffered from pain in the throat, accompanying speech or deglutition (excepting the onset of the scarlatina); neither had she suffered

¹ *Jahr. f. Kinderheilk.*, 1906, lxii, S. 95.

² See also Steel's article in *PROGRESSIVE MEDICINE*, December, 1906.

³ *Medical Record*, June 2, 1906.

from dyspnea or coughing. In the fall of 1905 she was treated twice for rheumatic fever in a hospital. During her first stay in the hospital she suddenly became very hoarse and dyspneic; there was no sore throat or painful swallowing. A laryngoscopic examination was made and symptoms of an acute laryngitis detected, besides the alterations described in the following notes taken during her last stay in the hospital. The right side of the larynx was quite normal, but the left wall of the vestibulum laryngis with the left arytenoid cartilage was turned over into the cavity in nearly a horizontal position and covered the posterior half of the rima glottidis and of the left ventricular band. The outlines of the left cartilago corniculatus and cuneiformis were clearly visible. In trying to correct the deformity with a probe, a rather considerable resistance was felt, and the cartilages, when let go, at once recovered their former position. The left superior corner of the cricoid plate and its nearest surroundings seemed somewhat more protruding than on the right side. The left vocal cord remained totally immovable in slight abduction, both during respiration and phonation; during the latter it appeared somewhat incurved and narrower than the right. The right vocal cord did not reach the left during phonation, but the apex of the



FIG. 1.—Laryngoscopic image during respiration.



FIG. 2.—Laryngoscopic image during phonation.

left cartilago corniculatus penetrated a little into the right ventricular band, and the arytenoid and cuneiform cartilages on the right side were pressed toward the cavity, so that this part of the right wall of the vestibule of the larynx lay pressed firmly against the turned-over part of the left wall and partly covered it. The voice could not properly be called hoarse, but was not pure; there was no dyspnea.

Hald believes that this case of luxation of the left cricoarytenoid articulation was in all likelihood a congenital malformation. That it was congenital must be inferred from the fact that the patient had been hoarse since her birth; that it was not the result of an inflammatory process was probable because the luxated cartilages and parts of the mucous membrane had fully retained their normal appearance, just as also the right cricoarytenoid articulation was normal. Yet it would not be correct absolutely to deny the possibility of the dislocation having been caused by a very circumscribed inflammatory process early in life (perhaps already in the fetal period). But the necessary supposition of so narrowly confined an inflammation—necessary because no other

visible alteration of the tissues has been left save the luxation—makes this hypothesis improbable. Neither can arguments for the inflammatory hypothesis be taken from the fact that the left arytenoid cartilage made considerable resistance against attempts at reposition, as it is well known from other luxations that fibrous adhesions normally form between the luxated part and its new surroundings. For this reason and because the muscles (especially the cricoarytenoids) had lost their power over the cartilage, the vocal cord necessarily remained immovable under phonation and respiration. One might perhaps feel tempted to consider the mentioned protrusion of the left superior corner of the cricoid plate as a result of a passed inflammatory process. It appears more probable to Hald that the protrusion was seen because the outlines of the plate here became more distinct, the mucous membrane being tightened by the luxated arytenoid cartilage.

Laryngeal Papillomata in Children. D. R. Paterson¹ states that the frequent recurrence of laryngeal papillomata in children, even after apparently complete removal, is a constant menace to the life of the child. He discusses the three methods of treatment in vogue, namely, thyrotomy, tracheotomy, and the endolaryngeal method, which latter procedure is to be preferred since suitable instruments have been devised. The instruments required for the removal of papillomata by the direct method are a fish-tail tube spatula with handle attached and a straight forceps. The best form of illumination is an electric head lamp. The operating table should be of sufficient height to enable the operator, when seated on a low chair, to work conveniently. If the table be too low, he has to assume a cramped, uncomfortable position in which the light is uncertain and the instruments are difficult to manage with ease and precision. The patient should be placed on the back, with the head hanging over the end of the table and a low pillow under the shoulders. Chloroform is the most suitable anesthetic to administer. The pharynx is brushed lightly with a 10 per cent. solution of cocaine, the tube spatula is introduced, and through it the entrance of the larynx and the under surface of the epiglottis are similarly brushed. A few drops of adrenalin may be added to the cocaine solution, as it prolongs the anesthesia and prevents hemorrhage during the operation. The difficulty with the mucous secretion is comparatively slight in this position, as it drains into the most dependent part of the pharynx. Very little chloroform is required to maintain the general anesthesia, a matter of some comfort to the operator, as the expired chloroform, coming out in a jet through the tube spatula impinges on the eye, causing smarting and interfering with the proper view of the parts. In the introduction of the spatula its point is passed along the under surface of the epiglottis and then tilted upward so that it carries that structure forward and enables an

¹ Lancet, July 31, 1906.

admirable view of the larynx to be obtained. In the majority of cases even this is not necessary. Placing the fish-tail end of the spatula on the base of the tongue, immediately in front of the epiglottis, and exerting pressure forward are quite sufficient to bring the interior of the larynx into full view, and the whole of the operation can be performed with the spatula in that position.

For the removal of the papillomata Paterson has had constructed a forceps with a straight shaft fashioned on the crocodile principle and terminating in a beak with cutting edges from the bend on the shank to the tip; the length is nearly eight inches (Fig. 3). It is used through the tube spatula, and is lightly built so as to interfere with the view as little as possible. At the same time it is capable of dealing with fairly tough tissue. Various forms of beaks have been constructed to fit into

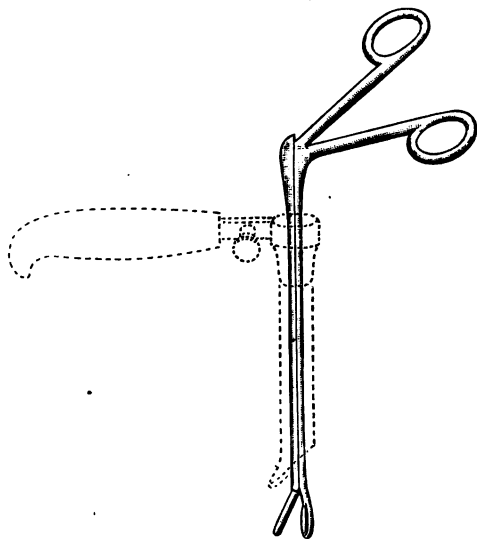


FIG. 3

the different parts of the larynx. In operating the forceps are introduced through the spatula and the pieces are grasped and removed. If this is done rapidly the larynx can be fairly cleared before hemorrhage shows itself to any extent. This is never very prominent, and the head being dependent, it runs into the pharynx, where it can be mopped away. The two parts of the larynx which are most difficult of access are the anterior commissure and the subglottic space. It is here that recurrence is most apt to take place, as the removal is generally imperfect. In one case the recurrence was eventually limited to the region of the anterior commissure.

The beak of the straight forceps can be inserted into this space, and a more complete clearance effected. It is more difficult to deal with the subglottic area, as the surface is more flat, and the projecting masses

are not so easy to grasp. The narrow-beak forceps have been found very serviceable, and their use may be supplemented by a curette. For this purpose Paterson employs a modification of Lörri's curette, which has a receptacle to catch the detached pieces of growth and prevent their being aspirated into the air passages, and, in addition, has terminals of different caliber to suit variations in the size of the larynx. The instrument has been adapted to the direct method by using a shank similar to that of the forceps. As it cuts from below upward, it is passed beyond the part and pressed firmly against the tissue; it is then drawn upward with a firm stroke. As a cutting edge can be adapted to any part of the interior of the larynx, any remaining papillomata can be effectually removed. Where recurrence takes place soon and is persistent, he advises in addition the wearing of a tracheotomy tube for a time. This has a distinctly good effect in retarding the growth and enables the operator to deal more thoroughly with the papillomata at each sitting.

Fisher¹ reports a sudden death, without premonitory symptoms, in a boy, aged ten years, who appeared to choke while eating his dinner. He had always enjoyed good health and had never required medical advice, his mother stating that she had occasionally noticed a slight hoarseness, but it was never sufficiently marked to call for special advice. He had never been troubled with shortness of breath or with any choking sensations, and he had been able to run about and play with other boys. On postmortem examination the upper aperture of the larynx was found to be almost completely occluded by a papillomatous tumor attached to the back vocal band. The case is mentioned as one of great interest, not only clinically, but also from a medico-legal aspect, it being difficult to realize how the child had remained free from any symptoms calling for medical advice.

Etiology and Treatment of Congenital Inspiratory Stridor. Ballin² includes among cases of stridor inspiratorius congenitus only those which answer to the following description: The condition must begin at birth, or at the latest a few weeks after; inspirations are exceedingly noisy, coming either from the larynx or below it; the noise may be produced with each inspiration or only during moments of excitement. The condition disappears toward the end of the first year, leaving no disturbance whatsoever of the general health. It never produces dyspnea, and if this is present a complication may be assumed to exist. Some authors believe the condition to be due to abnormalities in the larynx, chiefly a bending of the epiglottis and an abnormal approximation of the aryteno-epiglottic folds. Others believe it to be due to abnormal softness and yielding on the part of the infantile larynx, and consider the above-mentioned changes secondary results; some speak of spasm of the glottis

¹ Journal of Laryngology, Rhinology, and Otology, April, 1906.

² Jahr. f. Kinderheilk., 1906, lxii, 808.

and of incoördinated breathing, resembling the stuttering of the speech. The latest theory, defended chiefly by Hochsinger, explains the condition with hypertrophy of the thymus body. Ballin has observed 5 cases, in 2 of which autopsy was performed, and 2 others were examined by Röntgen rays. In only 1 could enlargement of the thymus be noted; this condition could, therefore, be excluded. Which of the other two theories is correct could not be determined even though serial sections of the tissues were made. The larynx in both fatal cases was found to be smaller than in cases of normal children, a point in favor of abnormality in development. Respiratory disturbances in such patients should be carefully guarded against and even slight disturbances energetically treated.

Diagnostic and Prognostic Value of an Examination of the Throat in Pulmonary Tuberculosis. W. G. B. Harland¹ states that, although not as well known as it deserves to be, it is nevertheless a fact that an examination of the throat is often of considerable value, first in calling attention to the presence of unsuspected pulmonary tuberculosis, and second in arriving at a definite prognosis when pulmonary tuberculosis is known to be present. He discusses the subject under the following two heads:

1. The value of a throat examination in calling attention to the presence of unsuspected pulmonary tuberculosis. He says that anyone who has seen many cases of tuberculosis of the lung will have remarked that the disease is often accompanied by considerable wasting of the mucous membrane of the upper air tract, together with changes in the quality of its secretions. The appearances being to a certain extent characteristic, it can be realized that recognition of the local changes will enable the physician to surmise the presence of tuberculous pulmonary disease even though he had before been ignorant of it. The symptoms associated with these changes in the nose and throat are in themselves suggestive of tuberculosis of the lung unless explained by other obvious causes. These symptoms are constantly recurring colds, continual dropping of mucus from the nasopharynx into the throat, hoarseness, and cough. Upon examination the mucous membrane is often found wasted and bathed with seromucus. Hypertrophies in the nose no longer obstruct, and often one can see the upper pharyngeal wall through the nasal fossæ. In such cases, too, there is present a persistent sub-acute laryngitis. A combination of such symptoms and appearances should at once arrest the physician's attention and lead to careful inquiry for other signs of the disease: for a history of loss of weight or of loss of strength, and anorexia, typhoid fever, pleurisy, malaria, or other disease that is likely to be mistaken for tuberculosis. The pulse and temperature should be studied, as increase of the pulse rate and subnormal or slightly elevated temperature are very common. Any of these suspicious

¹ New York Medical Journal, March 10, 1906.

signs will more imperatively call for repeated examinations of the sputum and examination of the chest by an expert.

Occasionally tuberculous disease of the larynx will reach an advanced stage before the disease in the lung produces symptoms severe enough to drive the patient to the doctor. The patient will come for treatment of the throat symptoms, and the characteristic appearances in the larynx will lead to an examination of the lung and sputum, the laryngologist knowing that laryngeal tuberculosis is due in the majority of instances to inoculation from sputum coughed up from a tuberculous lung. The typical lesions are a mound-like swelling between the arytenoids, congestion and superficial ulceration of the vocal cords, infiltration of epiglottis or arytenoids, with or without edema. The mucosa is pale, as a rule. Similar appearances may be produced by a number of other diseases, but usually a distinction can readily be made. The symptoms accompanying these lesions may amount to nothing, or may include cough, hoarseness, loss of voice, and pain on swallowing. A diagnosis should never be based upon symptoms alone, but upon laryngoscopic findings taken in connection with them. It is probable that the ordinary breath sounds are altered by the disease in the larynx, thus sometimes masking the local signs in a diseased lung.

2. The second part of the subject is not less important; it deals with the value of a throat examination in making a definite prognosis. As it is probable that macroscopic tuberculous lesions of the larynx do not ordinarily occur until after the general and local resisting powers have been partly destroyed, the appearance of laryngeal tuberculosis becomes to a certain extent an index of the seriousness of the patient's condition. The presence of any laryngeal involvement makes the prognosis less favorable, though not necessarily hopeless. Statistics have been collected to show that certain sorts of lesions portend less dangerous consequences than others, and that when certain parts of the larynx are affected the prognosis is more hopeful than when other parts are involved. Thus of those with simple infiltration twice as many improved as when deep ulceration was present, and of those without involvement of the epiglottis or arytenoids three times as many improved as when these structures were involved. It is needless to say that difficulty in swallowing in tuberculous cases is always a most serious complication.

Differential Diagnosis between Excrescences in the Interarytenoid Space. Horne,¹ after macroscopic and microscopic studies of tuberculous and non-tuberculous excrescences, points out that in the simple variety (*pachydermia verucosa simplex*) the excrescence is an exaggeration of pre-existing parts, so that the natural central furrow in the interarytenoid region is maintained in the growth, which is symmetrical, occupying the centre of the interarytenoid space. In the

¹ Journal of Laryngology, Rhinology, and Otology, January, 1906.

tuberculous variety (*pachydermia verucosa tuberculosa*) the growth does not occupy a central position; it is usually developed more on one side of the space and the central furrow is lost.

The Use of Opium in the Laryngeal Stenosis of Children. Hecht¹ considers that this mode of treatment for laryngeal stenosis in diphtheria, which was advocated by Stern in 1894, has not received the recognition, it deserves. In cases in which hoarseness, barking cough, stridor, cyanosis, and retraction of the chest indicate incipient obstruction, the necessity for a subsequent tracheotomy may be averted by the use of opium. The explanation of the action of the drug, under these conditions, is to be found in the inhibition afforded to the coughing impulse, so that sudden congestion in the affected areas is avoided, and there is lessening of the tendency to edematous swelling of the air passages. This applies, of course, only to cases in which the obstruction is not due to membrane formation; and the treatment is not intended to replace the use of antitoxin, but only to serve as an adjuvant to this.

LARYNGEAL STENOSIS AFTER TRACHEOTOMY OR INTUBATION. Coppetti² discusses the persistence of laryngeal stenosis after tracheotomy and intubation in relation to 1200 cases of *diphtheria* seen between 1900 and 1904. Of these cases, primary tracheotomy was necessary in 25 and secondary tracheotomy in 94; 300 were intubated. Postoperative stenosis persisted in 40 cases. The difficulty in many of these was purely mechanical (granulations, pressure of glands, etc.) or due to the grave condition of the patients (all children), for example, pneumonia or cardiac complications. There remained, however, 10 cases where no such explanation could be accepted. These might be divided into two groups: (1) where the stenosis and difficulty were due to a constitutional condition of "spasmophilia" associated with a rickety or tuberculous diathesis; (2) a smaller group where the spasm seemed to be reflexly produced by some pulmonary irritation, for example, bronchopneumonic foci. The author gives details of each of the 10 cases.

Paralysis of the Recurrent Laryngeal Nerve. Bonardi³ describes a case of *laryngeal hemiparalysis* caused by the pressure on the left recurrent laryngeal nerve by a dilated and hypertrophied left auricle. He describes the development of the aorta and its larger branches, and gives an account of other cases in which clinical and anatomical evidence has shown laryngeal paralysis to be due to the compression of the left recurrent laryngeal nerve between the aorta and either a dilated auricle or the pulmonary artery displaced by cardiac enlargement. Bonardi's patient, a domestic servant aged forty years, suffered from rheumatism four and a half years before admission to hospital. On admission she was suffering from dyspnea, and was sometimes unable to lie down; her

¹ Münch. med. Woch., July, 26, 1906.

² Gazz. degli Osped., April 1, 1906.

³ Gazz. Med. Ital., February 1, 1906.

pulse was 110, small and irregular, the respirations 28, and digestion was much disturbed. The heart impulse was diffuse, with a feeble apex beat in the nipple line in the sixth space. At the apex, systolic and presystolic murmurs were heard. There were also pericardial and pleuropericardial friction sounds. The cardiac dullness was increased upward and to the left, but there was no dullness over the manubrium or in the first or second right intercostal space. The liver and stomach were much enlarged, and the lower extremities very edematous. The urine was scanty and contained much albumin. The progress of the case was from bad to worse. A fortnight after admission there were signs of pulmonary infarction. Twelve days after this the symptoms suddenly became more urgent, with acute dilatation of the heart, increase of dullness over the upper part of the heart, systolic pulsation in the liver and jugular vein, and a decided difference between the two radial pulses, the left being smaller, more feeble, and often lost altogether. At the same time there was sudden dysphonia and barking cough. A laryngoscopic examination was made and the report was: "Profound anemia of the whole pharyngolaryngeal mucosa; complete left hemiplegia, with the vocal cord in abduction through paralysis of the left recurrent laryngeal." The postmortem examination, made three days later, confirmed this opinion and the clinical diagnosis of pericarditis and mitral stenosis and regurgitation leading to pressure on the recurrent laryngeal. The left auricle was found to be sensibly hypertrophied and enormously dilated, compressing the recurrent laryngeal against the aorta. Apparently the author explains the weakness of the left radial pulse by the pressure exerted on the aorta by the enlarged auricle, at the point of origin of the left subclavian artery.

Frischauer¹ reports a case of this rare complication associated with *mitral stenosis*, which was first described by Ortner in 1897. Five cases have been published in which the diagnosis was confirmed postmortem, and two others in which the clinical diagnosis was unconfirmed anatomically. The mechanism appears not always to be identical, and the nerve may be compressed in at least three ways: (1) The dilated left auricle may compress the nerve directly. This occurred in a case of Ortner's, in which the nerve was flattened between the upper wall of the left auricle and the aorta, and in one of Hofbauer's, in which the left auricular appendix was firmly wedged between the pulmonary artery and the aorta exactly at the spot where the nerve wound around the aortic arch. (2) The nerve may be compressed against the pulmonary artery, which is forced upward by the dilated left auricle, or in the acute angle between an abnormally directed ductus arteriosus and the left branch of the pulmonary artery. The latter mechanism was that found in a case recorded by Kraus in which the highest point of

¹ Wien. klin. Woch., December 28, 1905.

the auricle, though dilated, was at least two and three-fifths inches distant from the compressed portion of the nerve. (3) The left bronchus may be forced upward by the dilated auricle and compress the nerve against the aortic arch.

The writer's observation was as follows: A woman, aged thirty years, was admitted to the hospital on August 7. The apex beat was in the fifth interspace outside the nipple line. The cardiac dulness extended to the right of the sternum and upward to the lower border of the second rib. In the second interspace it was two fingers' breadth in width, and in the third about three. There were a systolic thrill at the apex and systolic and diastolic apical murmurs. There was also a faint systolic tricuspid murmur. There was a slight abductor paralysis of the left vocal cord, which later became complete, with extreme hoarseness. The *x*-rays showed that the cardiac shadow was greatly enlarged. The right auricle took little part in the enlargement, but at the left border of the shadow, above that of the ventricle, were two pulsating elevations, the upper due to the pulmonary artery and the lower to the left auricle. The space between the heart and vertebræ was almost filled by the dilated auricles. As all the usual causes of paralysis of the recurrent laryngeal nerve could be excluded with certainty or great probability, compression of the nerve by the dilated left auricle was diagnosed. Death occurred on October 30. The necropsy showed that there was extensive old endocarditis of the mitral valve. The ventricles and auricles were dilated and hypertrophied. The left recurrent laryngeal nerve was compressed between the aorta and the pulmonary artery, which was forced upward by the dilated left auricle and pulmonary veins. At this spot the nerve was thinned and flattened, and its fibers had degenerated.

G. Gavello,¹ in a paper on the same subject, also gives the details of a case occurring in a young woman aged nineteen years. He does not consider the view of Ortner satisfactory, that the paralysis is due to direct pressure on the nerve by the dilated auricle, but inclines to the theory of Kraus and Hofbauer, that it is due to a general descent of the heart and a dragging down of the aortic arch, causing pressure on the recurrent and consequent degeneration.

Treatment of Laryngeal Tuberculosis by Silver Fluoride. Megnon,² of Nice, has employed silver fluoride systematically for two years, in a number of cases who at present are well. He prefers a 1 per cent. solution, with which he makes rather energetic applications to the affected mucous membrane. In patients who support this treatment well he does not employ cocaine, but in others he uses preliminary local anesthesia, according to the extent of the disease and the susceptibility of the patient. The silver fluoride is only slightly caustic, and does not cause severe pain after the application; on the contrary,

¹ Bolletino delle Malattie delle Orecchio, etc., Florence, November, 1905.

² Revue hebdomadaire de laryngologie, d'otologie et de rhinologie, April 28, 1906.

the pain caused by the lesions is relieved a day or two after its use. This, however, is not always the case, as patients differ in the degree of suffering according to the location and extent of the lesions and the condition of the nervous system. The suffering is relieved more or less, then, according to the condition of the individual patient. Megnon gives the preference to silver fluoride applications when the larynx reacts violently and where there are attacks either of intense congestion or of spasm; also when there are painful ulcerations. He does not, however, abandon for it all the other remedies usually employed, such as lactic acid, sulphuric acid, phenol, balsam of Peru, and guaiacol, which have their appropriate indication. The silver fluoride has one very useful indication; it may be used with advantage to complete the endolaryngeal surgical treatment with the forceps or the cautery. Good results have been obtained in such cases of after-treatment with this agent.

HELIOOTHERAPY IN LARYNGEAL TUBERCULOSIS. Collet¹ records the successful treatment of a case of laryngeal tuberculosis by the action of the sun's rays. He saw a man, aged thirty-three years, for the first time on March 10, 1905. The symptoms were slight cough, wasting, and dysphagia, with loss of voice. On examination there was no rise of temperature, and the only pulmonary lesion was a little loss of resonance on percussion at the right apex. The laryngoscope showed great infiltration of the epiglottis and of the arytenoid cartilages. The epiglottis was swollen, gray, and indented; it was very rigid, and the curvature was partly lost. The arytenoids had a similar appearance; the infiltration of the ventricular bands resembled the teeth of a saw. The vocal cords were untouched. There was nothing abnormal in the pharynx or nasal cavities. The patient went to the south of France, away from the sea. He practised the heliotherapy by facing the sun and directing the rays on to the larynx by means of a laryngoscopic mirror. This maneuver he managed for five minutes at a time, for at first half an hour and afterward an hour a day. The treatment was associated with generous feeding and the administration of cacodylate of soda, measures which had been tried without success for some time before the heliotherapy. The patient was examined again on November 9. The epiglottis had become supple; the border was smooth, save for a small notch to the right; there were no nodules; the normal rose color had returned, and the mobility during phonation was perfect. Some of the arytenoid lesions persisted, so that the patient was instructed to direct the sunlight directly into the vestibule of the larynx. Another examination on December 13 showed the arytenoid swelling to have entirely disappeared. The general health improved with the amelioration of the local lesions.

¹ *Lyon médical*, January 7, 1906.

Macroscopic Diagnosis and General Indications for Treatment of Cancer of the Larynx. John N. Mackenzie,¹ of Baltimore, insists on the application of a naked-eye method of diagnosis in the case of malignant tumors of the larynx. He urges that every resource and refinement of clinical diagnosis, including the exclusion of syphilis by the iodides and tuberculosis by tuberculin, should be resorted to before an appeal to the microscope is made. The moment the continuity of the growth is broken, in that moment is opened the pathway for self-poisoning, and an unfavorable influence is exerted on the local process. If ulceration has already taken place, a portion of the growth can be taken for microscopic examination, but in the majority of cases the tumor is buried and an exploratory incision for the purposes of microscopic diagnosis means two operations. If the tumor is malignant, this opens the way for general dissemination. The microscope should be the final method of appeal. If a microscopic examination is necessary, the patient and surgeon should be prepared for immediate operation.

Thyrotomy vs. Laryngectomy: Notes on the Frequently Malign Nature of Chronic Hoarseness. Chevalier Jackson² directs attention to the frequently malignant nature of chronic hoarseness. He considers the time spent in acquiring skill in endolaryngeal operations for malignant disease as utterly wasted, for, while failing to extirpate the growth completely, it induces local spread and metastatic deposits. He reports two cases in illustration of his views, and draws the following conclusions: (1) The patient with *cancer of the larynx* must have his disease discovered early, else a cure is well-nigh hopeless. (2) If discovered early the comparatively slight operation of thyrotomy will cure. (3) If discovered late, total or partial laryngectomy will probably prolong life for a variable period, but recurrence is fairly certain and the short extension of existence lacks many pleasures and comforts. (4) The early curable stages of laryngeal cancer are characterized by nothing but hoarseness, which may disappear and recur. Cough, odor, pain, odynphagia, glandular involvement, external swelling, emaciation, cachexia, etc., are present only after the curable stage is passed. (5) The curable case may come in "to get something for a cold that he cannot shake off," without any idea of a serious condition, and throw us off our guard.

Case of Inoperable Cancer of the Fauces, the Pharynx, the Tongue, and the Cervical Glands Treated with a Bacterial Vaccine of Neoformans. Scanes Spicer and A. E. Wright³ presented the following interesting case before the Laryngological Society of London, June 1, 1906: The patient, a Balaclava veteran, aged seventy-five years, was sent to the Throat Department of St. Mary's Hospital, in March, 1906, by Dr. W. T. Evans, for an ulcerating growth in the throat and enlarged glands in

¹ Annals of Otolaryngology, Rhinology, and Laryngology, March, 1906.

² Medical News, December 9, 1905.

³ Journal of Laryngology, Rhinology, and Otolaryngology, London, June, 1906

the neck. The tumor occupied the site of the left tonsil, the faucial pillars, the side of the tongue, and extended down the wall of the pharynx. It blocked the faucial isthmus sufficiently to prevent laryngoscopy even with the smallest mirror, but there was no affection of phonation or respiration. The tongue could not be extruded. The surface of the growth was studded with bloated fungous granulations embedded in copious, brownish-yellow, fetid fluid on an ulcerated, purplish base; there was a large mass of swollen, hardened glands behind the angle of the jaw. There was considerable dysphagia and much pain in the left side of the head and the ear, on trying to swallow. He had lost much weight lately, but could not say how much.

The case was diagnosticated as malignant and inoperable—a view in which Mr. A. J. Pepper concurred. A portion of the growth was removed from the tonsillar area. Iodide of potassium, gr. 15, three times

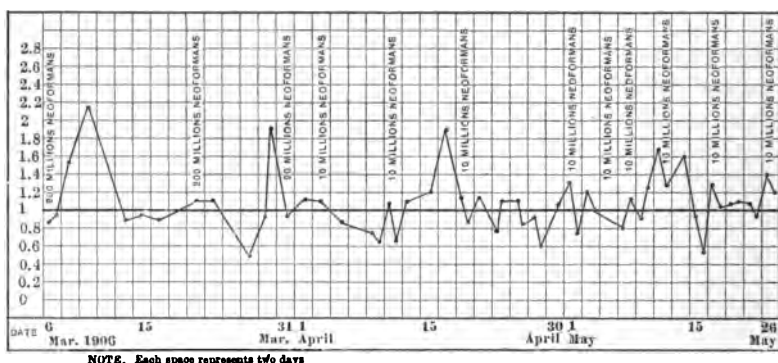


FIG. 4.—Chart to illustrate Professor Wright's remarks explanatory of the treatment of Dr. Scanes Spicer's case of inoperable cancer of the fauces.

a day, and an antiseptic gargle were given for a week. As no improvement was observed this was stopped; the Pathological Department having reported that the growth was a spheroidal-celled carcinoma, the patient was sent to the Inoculation Department with a view to treatment by a bacterial vaccine, by Professor A. E. Wright. This was carried out as shown by the accompanying chart indicating the doses, intervals of injection, and the opsonic reaction of the blood. The condition of the fauces and the glands was regularly and carefully observed by Dr. Scanes Spicer. The favorable changes commenced at once and continued to increase for five or six weeks, after which there was no further improvement, but no regression. The patient lived at home, and walked to the hospital for treatment. The changes observed were: (1) diminution in the size of the faucial mass, so that laryngoscopy became possible; (2) lessening of the ulcerated surface, and the unhealed part looking like a healthy granulating surface; (3) disappearance of the

bloated granulations; (4) loss of fetor; (5) disappearance of dysphagia and pain in the throat; (6) the tongue became less rigid; (7) the external mass shrunk down enormously, leaving one small, hard gland. No other treatment was used. Whenever the opsonic power was low the patient invariably complained more of head pains. No opinion was tendered as to whether the treatment had influenced only secondary ulcerative and septic processes or the malignant substratum itself, nor did it seem determinable what were the proportions which these factors bore in the sum-total locally. The whole improvement was nevertheless marvellous both locally and in the patient's general condition, and the case was of good augury for the influence of the method. A cure was not claimed, and the patient was shown as still under treatment in case unfavorable changes should supervene before next session. The clinical record was incomplete, but the history and stigmata of syphilis were negative.

Professor Wright said that Dr. Doyen, as was well known, had asserted that there could be obtained by culture from all, or practically all, new-growths—whether of a malignant or a non-malignant nature—cultures of a characteristic microbe. This microbe was, by Doyen, regarded as the specific cause of cancer on the ground that it produced in his hands, when inoculated into rats, neoplastic lesions. It was accordingly named by Doyen the *Micrococcus neoformans*. While those who have seen Doyen's sections of the lesions obtained by him in rats by the inoculation of cultures of his *Micrococcus neoformans* do not, so far as Wright knew, agree in the view that the lesions he produced were of the nature of new-growths, there can be no doubt of the singularity of the pathological changes which are here in question. In specimens given to Wright by Dr. Doyen the whole upper lobe of the rat's lung has been converted into a mass of cartilage. Here and there, through the rest of the lung, are scattered large masses of embryonic cells—perhaps only scar tissue. Interspersed with these are masses of epithelial tissue somewhat resembling adenomata—possibly only large epithelium-lined diverticula taking origin from the bronchi. However this may be, Metchnikoff first and after him many others—including some of Wright's fellow-workers at St. Mary's Hospital—have confirmed Doyen's statement that a characteristic microbe—the *Micrococcus neoformans*—can be obtained by culture from tumors. The microbe in question has a superficial resemblance to the staphylococcus. Wright states that it differs from it, however, in the following particulars:

1. When first taken from the body it gives only very sparing cultures on ordinary agar.

2. In film preparations it is arranged, not in clusters like the staphylococcus, but in short chains, and in particular in Y-shaped figures—*i. e.*, in short, bifurcating chains.

3. It is agglutinated by normal human serum,¹ even when this has been diluted two hundred or more times.

4. The *Micrococcus neoformans* can be further differentiated from the staphylococcus by the fact that a blood which possesses—whether as a result of artificial or auto-inoculation—a high opsonic power with respect to the *Micrococcus neoformans* may possess a low opsonic index with respect to the staphylococcus, and vice versa.

A scientific basis for the differential diagnosis of the *Micrococcus neoformans* having thus been obtained, and having verified by these means that a culture of the *Micrococcus neoformans* supplied by a Belgian observer (Geets) corresponded in all respects with two cultures² obtained by us at St. Mary's, we have recently begun to address ourselves to the task of investigating the opsonic and agglutinating power of the victims of malignant disease with respect to the *Micrococcus neoformans*.

It will suffice to say, with respect to the agglutinating and opsonic powers of the victims of malignant disease, that these differ from the normal (1) in the fact that they are lower and in others much higher, (2) in the fact that the opsonic index is in some cases constantly fluctuating as it does in cases of bacterial infection which are associated with constitutional disturbance, and (3) in the fact that phagocytosis is in some cases obtained with the serum after it has been heated to 60° C. for ten minutes. We have here, it seems to me, ground for concluding that infection by the *Micrococcus neoformans* is one of the factors which must be reckoned with in connection with malignant disease.

¹ The fact that some of his cultures of the *Micrococcus neoformans* were agglutinated by normal serum is incidentally noted by Karwacki (*Centralblatt f. Bakteriologie* (original, 1905), vol. xxxix, p. 369, as a complication which presents itself in connection with the appreciation of the value of the agglutination obtained by him with the blood of cancer patients. The fact that the *Micrococcus neoformans* is agglutinated by every normal human serum while the staphylococcus is not so agglutinated appears to have been overlooked by this observer.

² The first of these cultures was obtained by Dr. Loveday from the interior of a breast amputated for carcinoma, the second by Dr. May from the discharge from an ulcerated surface of an epithelioma in the glands of the neck, secondary to epithelioma of the tongue.

OTOLOGY.

BY B. ALEXANDER RANDALL, M.A., M.D.

Diseases of the Labyrinth. The keynote of the advance in otological work during the past year has seemed to be in relation to the labyrinth and its diseases. The subject has been increasingly studied for some years past and while the latest progress is not epoch-making, yet the knowledge gained is crystallizing into more available shape, and what has been the bold groping of the individual is becoming the common standing ground of the profession. The surgical side is advancing with the medicinal and the differential diagnosis, and despite many puzzling gaps and seeming contradictions, is still gaining surer footing.

Part only of the work is published in otological journals, as it is largely neurological and serves the double purpose of linking the specialities the closer as well as adding to their resources. This was well exemplified last year in the part taken by the Boston neurologists in the meeting there of the American Otological Society—a coöperation which may be advantageously continued, as it was at this year's meeting in New York and in Allen Starr's paper on "Intracranial Lesions of Otitic Origin" in the Section of Otology, New York Academy of Medicine.

HEREDITARY OTOSCLEROSIS. Koerner¹ deals with otosclerosis in the light of heredity. He deplores that family trees of such cases have not been more frequently recorded; this having been done in but two instances in literature, namely, by Hammerschlag. He adds the trees of three families, including altogether 43 cases, apparently 36 of the 116 children in the five families. Counting the 7 deaf parents, there were 17 males and 26 females in the three or four generations; all 7 of the children in a fourth generation having otosclerosis, as had both of their consanguineous parents. He points to the large families and the absence of any evidence of syphilis in some of these trees as being against ascribing the affection to syphilis, and takes the ground that it is inherited, as he claims no *disease* strictly speaking can be called. With Siebenmann, he regards the spongy changes of the labyrinth capsule as due to a transmitted family "determinant" to develop changes not usual in compact bone. Atavism is pleaded when immediate inheritance is out of the question; one or more generations have been skipped with reversion to the older type. "The apparently spontaneous causes of

¹ Arch. f. Ohrenheilk., October, 1906.

otosclerosis can, therefore, easily be explained by latent inheritance. When the determinant of the abnormal development has become active, every hope of successfully combating this affection must be regarded as futile. We may accomplish something by advising the person who is suffering from otosclerosis not to marry, so that he will carry with him to the grave his determinants. In the female descendants of one suffering from otosclerosis who are not deaf, the advice not to marry is especially important, because every pregnancy is apt to incite the latent determinant into action." It is to be doubted whether this "law" has yet been proved to the full conviction of the majority of disinterested persons, not to mention those whose lives would be made thus subject to it. I find also an increasing number who agree with me in taking a less hopeless view of these unfavorable cases and believing that some of them can be stayed in their progress.

Zwaardemaker calls attention anew to a fourth symptom of sclerosis as noted by Itard and Cholewa—anesthesia of the drumhead to the palpable sensation of the slowly vibrating tuning fork. This is quite inaudible, but is perceived as a tactile impression by the ear that is not sclerotic. This seems akin to Ogston's "touch deafness," as he styled a seeming numbness about the auditory meatus of an ear with labyrinthine disease; the ear which fails to *hear* a touch near the tragus hardly notices the merely palpable sensation. Each may be an aid to diagnosis in some cases.

SYMPTOMS OF LABYRINTH DISEASE. An interesting study of Prof. Eno Kubo,¹ of Japan, on the "Relation of Ocular Movements to Irritation of the Labyrinth of the Ear," was presented at the International Congress in Lisbon.

He finds that, by heat and cold in douching or by direct thermic irritation, ocular movements are produced without participation of other nerves or consciousness on the part of the animal. Experimenting on birds and fish he was able by heat to elicit bilateral nystagmus toward the affected ear and in the horizontal plane, but away from the affected ear when the irritant was cold. The heat acted more slowly, but more persistently. The action is most marked upon the horizontal canal and is present even when this has been partly removed, but ceases upon opening the vestibule. The position of the head affects the result; but pressure seems to be without influence, since irrigation with water at body temperature provokes no movement. Such studies carried out upon human beings may prove of distinct practical value in explaining the phenomena as encountered in diseased conditions, and clear the somewhat contradictory findings of ocular movements in disease of the labyrinth and cerebellum. Thus Barany² reports from Politzer's

¹ *Annales des maladies de l'Oreille, du Larynx*, September, 1906

² *Arch. f. Ohrenhkl.*, lxviii, 1.

clinic his findings in 150 normal, diseased, and deaf-mute persons as to torsion movements of the eyes. He measured the deviation from its primary position with erect head of an iris-marking as the head inclined 20, 40, or 60 degrees toward the shoulder. He concludes that unilateral labyrinthine disease may make no change; but in cases of vertigo those with organic lesions showed markedly less response than normal, as did also their nystagmus after swinging, etc. Neurotic or malingering cases presented the normal relations. Heat or cold in syringing affected little the organically affected labyrinth just as seasickness is rare in such cases.

Hinsberg¹ deals with the findings as to labyrinthine disease met in *tympanic exenteration* and in a second paper with the *indications for opening the suppurating labyrinth*. He lays stress upon intense illumination as aiding the discovery of any accessible fistulous tracts, but that those into the vertical or posterior canals can be found only by the probe. The functional tests by tuning forks, etc., are more instructive. Limited lesions may heal with the middle-ear trouble and are to be expectantly dealt with. In a recent case of my own with disabling vertigo, vomiting, and slight indeterminate nystagmus, meningitis or cerebellar disease were fairly excluded, while extensive labyrinthine lesion was incompatible with the good bone conduction and hearing throughout the scale. The diagnosis of a limited lesion of the horizontal semicircular canal was borne out by the finding of a small area of necrosis here with a cholesteatoma mass pressing upon it. The labyrinthine perilymph was sanious but not purulent, and curetting clean the affected area has not injured the hearing. There are latent cases, however, with slight irritation symptoms which would be prone to cause intracranial trouble, and any symptoms of such tendency demand prompt opening of the labyrinth. This is well borne out by a case reported by Burger to the Netherlands Society at its meeting last May. Middle-ear exenteration showed caries of the labyrinth wall, and was followed by awakening of the latent lesion. Three days later the vestibule was opened and the posterior cranial fossa drained of its pus. The meningitis was but briefly checked and soon went on to a fatal issue. There was a carious lesion of the posterior canal opening into the cerebellar fossa.

LABYRINTH OPERATIONS. Lake² reported a series of operations upon the labyrinth for the relief of inveterate *vertigo*, critically studying in comparison with them the intracranial operation on the acoustic nerve and minor measures. He notes absence of all mortality in his operation and greater success than in the mere extirpation of the external semicircular canal; and so advocates exenteration of the vestibule, after opening the external semicircular canal and following it to its ampullar

¹ Zeitschrift f. Ohrenheilkunde, lii, 1 und 2.

² Lancet, January, 1906.

union with the vestibule. The superior canal is similarly dealt with, and so much of the vestibular wall removed as can be done without injury to the facial canal. The cavity is then curetted, including the ampulla of the posterior canal, and the stapes removed to facilitate drainage of the vestibule, which is mopped with a strong antiseptic solution and filled with iodoform emulsion. Little shock or reaction has followed the perfected operation, and the relief of the disabling vertigo has been prompt and complete. Politzer reported 6 cases cured by the similar operative method of Neumann, and Milligan has reported a group.

Voss presented, at the December (1904) meeting of the Berlin-Otological Society, a patient with meningitic symptoms. Repeated lumbar puncture showed high pressure and cloudy polynuclear fluid, which he ascribed to limited meningitis. The case was cured by removal of a semicircular canal sequestrum.

MENINGEAL COMPLICATIONS. Grossmann¹ has noted increasing publications on healing in spite of cloudy, purulent cerebrospinal fluid after lumbar puncture. Two cases of his own resolved and he holds such findings no counterindication to operative measures.

From Koerner's clinic in Rostock, Takabatake² reports on the *crossed paralyses and disturbances of speech in otitic suppurations of the brain and meninges*. He reaches the conclusion that when we find paradoxical results, such as aphasia in right-sided sphenotemporal lesions, the explanation is a toxic meningo-encephalitis of perhaps a slight and transient type. He cites cases of marked pressure due to new growths and pus to show that mechanical pressure alone does not cause crossed symptoms. He quotes Koerner's observation that in basal meningitis the gyri of the convexity are often flattened beyond any correspondence with the ventricular distention present, and believes that inflammatory edema is the cause of the distant symptoms which even extradural lesions can at times produce. In this connection I may note that I have seen extradural abscess of the tegmen associated with compression of the overlying temporal lobe and pial and cerebral injection disproportionate to the extradural lesion, while there was no recognizable abnormality of the intervening arachnoid. By mere contiguity, without plastic exudate, the infection had passed through and red softening had begun, which in a few days more would have formed a sphenotemporal abscess. The involved brain tissue is not usually the superficial or the more exposed part, but is separated by apparently healthy structures from the causative lesion.

Studying also the *eye-ground changes in otitic diseases of the brain* in the same clinic, Takabatake³ adds to the 54 cases previously published by Koerner, and cites 16 instances in 54 cases where the lesion was proven

¹ Lancet, January 10.

² Archives of Otolaryngology, October, 1906.

³ Ibid.

by operation or autopsy. The optic nerves were involved in 10 of the 14 having multiple lesions; in the simple affections the neuritis was not always present nor more marked on the affected side. Whitehead,¹ in 5 uncomplicated among 17 temporal, and 3, 1 complicated, of 21 cerebellar abscesses verified by autopsy, found optic neuritis present; also in 8 of 33 meningitis and 5 among 19 sinus thrombosis cases.

Meningitis. Following up his previous studies in collaboration with C. W. Keene of pneumococcus and staphylococcus infection of the brain, E. E. Southard and R. R. Stratten report an investigation of 9 cases of *acute streptococcus leptomeningitis*. Six of the cases were of aural origin and 1 had sphenoid empyema; 2 only seemed pulmonary in causation. The vascular changes were marked and in most respects the lesions closely approximated those due to the pneumococcus, most of which had their origin in the lungs. The most practical point for the clinician is that all the lesions seemed open to recovery and death would seem to have been largely toxic. This emphasizes the need for vigorous eliminating and supporting treatment, as well as for operative measures in clearing up the offending ear and seeking any brain abscess present. As the exudates were largely in the substance of the pia, the value of the arachnoid irrigations, which I advocate, would seem problematical.

Hinsberg² makes a valuable addition to the question of *operative treatment of meningitis*. He cites a series of cases, one of which was a man of thirty-three years admitted under Kuemmel's care six days after a fall. There had been a flow of cerebrospinal fluid from the nose, deafness and tinnitus on the right side, increasing vertigo, and headache, but no paralysis. Stupor increased with opisthotonos, temperature 104° and strabismus, and lumbar puncture gave 20 c.c. of thick, purulent fluid. After five days, when apparently moribund, with small pulse but no focal signs, a two-inch trephine opening was made on each side near the occiput, and the dura was incised, showing the arachnoid cloudy and injected. Purulent fluid was removed and suction tampons inserted. On the second day the condition improved, but the lumbar fluid remained cloudy for six days; in five the patient ceased to cry out, but on the left side developed facial palsy. In ten days the mind was clear, but speech and writing were disturbed. Complete restoration took place in six weeks. Smears from the lumbar fluid were sterile, but the condition seems to have been diffuse meningitis that could not have been saved without operation.

This extreme case certainly adds hope to the contention, which I have been pressing for five years past, that these cases and also those of tuberculous meningitis ought to be operated upon and often irrigated as well as drained. I am sure that lumbar puncture has helped the serous cases

¹ Otological Society of Great Britain, Archives of Otology, October, 1906.

² Arch. f. Ohrenhkl., 1906.

and that drainage has done more, and when I washed away drams of purulent exudate it was with confidence that the procedure was correct, although probably too late to avail in such a widespread condition. My cases saved have been few and open to question; but I cannot feel that they would have done so well under merely medicinal measures. The hollow silver spatula lifts the brain gently away from the dura, affording a good backflow for the fluid jetting from its peripheral openings, and I do not believe it does any harm.

An interesting instance of relief of *epilepsy* following mastoid operation and exploration of the brain is reported by Emerson. The patient, very deaf from an old catarrhal process, was admitted to the Orange Hospital with acute tympanic suppuration and mastoid symptoms. Moderate mastoid disease was found at operation, at the close of which the sigmoid sinus was accidentally opened. After some improvement, fever, headache, and slight optic neuritis developed; later anorexia, lowered temperature and pulse rate supervened, and she rapidly lost ground. About four weeks after the mastoid operation the sphenotemporal lobe was exposed. Much clear fluid escaped on opening the dura, but no abscess could be found in the bulging brain. Marked improvement soon followed, however, after drainage from the wound, and the patient left the hospital in three weeks. Two weeks later complete healing had been attained; her hearing was distinctly better, ordinary conversation being audible instead of only the loud voice. The epilepsy diagnosticated a year previously, after full study, has given place to a freedom from all attacks for sixteen months after the operation. As in the case which I reported last year, a longer time still must elapse before we dare claim a true cure.

LEPTOMENINGITIS. Lombard,¹ of Paris, reports 4 cases of *paralysis of the external rectus in connection with tympanic suppuration*, and analyzes, in addition, cases reported in the literature. He divides them into three groups: (1) Those in which the lesion (cerebellar abscess, extradural abscess or basal meningitis) is almost always situated in the posterior fossa and affects the function of the nerve trunk in its extrabulbar course. (2) Those in which recovery seems solely reflex and absolutely distinct organically from all concomitant lesions. (3) Acute purulent otitis media, with paresis of the externus and temporo-sphenoidal pains from Gradenigo's syndrome.

This he ascribes to limited leptomeningitis, although admitting that such a relation is unproved either by operation or autopsy. The lesion may heal or may cause fatal extension, in which case the later changes mask the earlier phases. Absence of leukocytosis in the blood or lumbar fluid, the exemption of other neighboring nerves, and lack of cerebral symptoms make such a meningitis questionable. A lesion of the abdu-

¹ Ann. d. mal. de l'Oreille, October, 1906.

cens nucleus, a phlebitis of the cavernous sinus, or a merely toxic neuritis have been suggested as alternative explanations; probably each is at times the real cause. Disease of the apex of the petrous bone can involve also the Gasserian ganglion or its branches; only at times does this go on to the fatal termination of Knapp's case, elsewhere cited. An added foothold will be given to our progress toward comprehension of these intricate problems by the minutely detailed reports of such cases and their conscientious analysis.

Brain Abscess. Heimann, in reporting a cured case of *temporal brain abscess* due to self-inflicted injury of the ear by caustic instillation, summarizes the records of brain abscess so far as accessible in literature. He is able to assemble a series of 645 cases, including 395 sphenotemporal, 186 cerebellar and 10 of both, 19 of temporal and occipital, 13 undesignated in the cerebrum, 9 occipital, with other rarer locations. The location was cerebral in 70 per cent. and cerebellar in about 30 per cent. Men were twice as numerous as women among the sufferers. The greatest proportion of cases occurred in the third decade of life, with but few under five or over fifty years of age. There was rather an accidental difference of tendency to the middle or posterior fossa at different ages. So, too, the claim that the right side is more often affected finds little support from his figures, which give 110 indeterminate, 292 on the left side, and 242 on the right side (55 per cent. and 45 per cent.). He accords little credit to the claim that more operative cases occur on the left side because of more frequent localization due to aphasic symptoms. Of 35 cases with bilateral otorrhea, 18 were on the right, 17 on the left. There were 80 left cerebellar abscesses to 54 on the right. Of crossed lateralization he is quite skeptical, believing such a diagnosis often erroneous; while certainly most of the abscesses were in immediate relation to the diseased bone. As to operative results he fears that too often the favorable only have been published. Of 41 operations in Schwartze's clinic but 8 were healed, and of his own 8 but 2. Macewen's record of 80 per cent. stands unparalleled; and he points to cases in his tables reported as cured within four days after operation. Later reports would doubtless reduce the cures thus claimed. Of 519 operated, 193 (37 per cent.) seem to have been cured, the acute cases being 40 (35 per cent.) in the chronic. He refers to 4 published cases of spontaneous cure, but records only 1 in his elaborate and valuable tables.

Starr recently cited from the literature of the past six years 54 temporal, 25 cerebellar, and 2 occipital abscess cases operated on—81 in all. In 6 the abscess was found only at autopsy. Death occurred in 39; 42 recovered—only 9 of 25 cerebellar abscesses. He, with Blake and others participating in the discussion, strongly advocated separate and wide opening of the skull, evacuation by gravity aided by hot irrigation, which should be maintained throughout the operation, and drainage by a tube.

CEREBELLAR ABSCESS. Schutter¹ reports a case of cerebellar abscess in a girl, aged eighteen years, who had had ear suppuration for ten years. There was sudden headache, vomiting, and vertigo, and rotation of the visual fields toward the affected right side. Middle-ear exenteration only temporarily relieved the symptoms. Paresis of the externus, defect of speech, and dysarthria supervened later. A second operation revealed a sequestrum of the posterior antrum wall, but the dura was normal. A third operation entered a large cerebellar abscess, but the patient survived only five days. Autopsy showed most of the labyrinth sequestering and the abscess occupying almost the whole cerebellar lobe.

In discussing a fatal case of cerebellar abscess, Dench² notes that of 16 successful cases recently collected 10 were superficial. He refers to the difficulties of finding and draining pus cavities deep in the cerebellum, and advocates the plan commended by Macewen at the Bordeaux Congress. Macewen recommends exposing the brain and packing off the arachnoid space; then after sufficient time has elapsed for adhesive inflammation to take place the exploration can be carried into the substance of the cerebellum or cerebrum with less chance of disseminating the infective process. The abscess is most likely to be in the anterior portion of the cerebellum close to the labyrinth, or the sigmoid sinus from which this infection was propagated. It is difficult of access here, unless the sigmoid has been opened and can be used as the site of entry, as in a recent case of B. H. Potts; down and back from the sigmoid the mastoid emissary is a serious obstacle to any attack at that favorable point. The trephining must, therefore, be occipital below the curved line, and the search for the abscess and its drainage, if found, made through much of the cerebellar substance. If exploration be attempted through the inner wall of the opened sinus or any other infected tissue, this should be first seared with the cautery; but as a rule I hold that the search should be made in a fresh, aseptic region wholly distinct from the mastoid wound.

Phlebothrombosis of the Jugular Vein and Sinuses. Iwanoff reports, from the Moscow clinic of Basanow, 9 cases of uncovering of the jugular bulb, in 6 of which it was opened and evacuated. He prefers generally his own simple method of following down the sinus, as done also by Voss and myself, to the more complete but difficult operation of Grunert. He has been able to satisfy himself that the bulb can be emptied and drained completely in this way. He gives in detail one of his cases where the vessel was not opened beyond a test puncture of the sigmoid, the burrowing pus being found almost exclusively along the discolored sinus, bulb, and upper 2 cm. of the jugular, although it had formed a granulating exit on the floor of the auditory meatus. Marked deafness, severe pain, and general pyemic symptoms had led to an operation in a

¹ Méd. Tgdscht., p. 266.

² Trans. Amer. Otological Soc., 1906.

case having most of the marks of a severe furuncular abscess of the meatus. At no time could he, by pressure upon the neck swelling, force pus out of the fistula in the meatus, although the patient claimed once to have done so. The case in some respects resembles one referred to me by a general surgeon, in which pus was flowing from the floor of the meatus and could be forced from the neck swelling, and from which fistulas also extended to the front of the trachea. The digastric fossa was full of pus and its bony walls bare; but the mastoid was intact, as was the middle ear. Later a fistula leading to a carious area on the lateral process of the second vertebra was found, which seemed the primary seat of trouble.

Eagleton enters a protest against the indiscriminate ligation of the *internal jugular vein*, because of the circulatory disturbances which may be produced, especially if the other jugular be subnormal in size. In support of his contention, he cites numerous instances in the literature. He reports the case of a boy of nine years with a chronic purulent ear discharge, mastoid symptoms, and some malarial condition, the latter being marked by a fluctuating temperature uncontrolled by quinine, but no chills. The sinus was found thrombosed, open, and oozing pus near the jugular bulb. Ligation of the jugular vein caused a profuse flow of blood from the upper wound. A marked double optic neuritis, not present just before the operation, was found the following day. A general septic condition followed and the ligated jugular was excised, its upper portion being bathed in pus. The hemorrhagic tendency continued, the optic neuritis seemed more intense, total blindness ensued, and there was evidence of serous meningitis with profuse venous hemorrhage and discharge of cerebrospinal fluid through a small opening in the inner wall of the sinus. A search for brain abscess was unavailing and the patient died ten weeks after operation. Eagleton regards the firm tampon necessary to control the hemorrhage as one of the causes of failure to relieve the septic condition and ascribed most of the disaster to the jugular ligation. He urges, before ligating the jugular vein, the free opening of the sinus and following the clot down to the bulb to prove the need of ligation. He also recommends the temporary compression of the vein to test its effect on the circulation of the head, the avoidance of injury to the external jugular vein, and that the ligature be placed if possible above the entrance of the facial vein.

Moure reports among 750 *mastoid cases* 15 of *sinus phlebothrombosis* with 8 cures; 12 of the cases were on the right side; 2 were devoid of temperature variations; 1 was draining through the tympanum. He used broad drainage, but never ligated the jugular vein, although most of the cases seem to have been chronic otorrheas.

Van der Wildenberg reports a latent *thrombosis of the lateral sinus*. A man, aged twenty years, with chronic otorrhea, suffering for eight days severe pain, radiating over the side of his head and neck, had a tender

mastoid and moderate fever. Exenteration gave no relief; two days later the thrombosed sinus was emptied and the jugular vein ligated. No lumbar puncture was made. Death occurred as a result of meningitis. No chill or marked temperature changes gave aid to a more timely diagnosis.

Langworthy¹ proposes that in case of *cavernous sinus thrombosis* the attempt be made to drain from the underlying sphenoid sinus, which is laid open by the orbital route, with removal of posterior turbinal, etc. He emphasizes the hopelessness of other measures and the less shock and hemorrhage of this as compared with the Hartley-Krause method of approach. In his second paper he deals with cavernous sinus thrombosis in its various aspects and causation. He reiterates his advocacy of the orbital operation and considers, but unfavorably, the exenteration of the orbit and operation through its apex in case the eye is already lost. He holds that through the sphenoid the carotid can generally be avoided while the bottom of the middle cerebral fossa as well as the cavernous sinus can be reached and drained.

Arnold Knapp² reports cavernous sinus thrombosis in a diabetic aged thirty years, with ozena, in whom acute middle-ear suppuration ran a harmless course on the left side after repeated paracentesis; but in the right ear it caused severe hemicrania and protrusion of the right eye within a week after its onset. Paracentesis of the thick, red drumhead started a free purulent discharge containing diplococci in capsules. The left eye later shared in the protrusion, while the right receded slightly and the patient died in coma in twelve days. The autopsy showed generalized osteomyelitis with little pus, but disintegration of the bone, especially at the petrous tip under the Gasserian ganglion and superior petrosal sinus. Both cavernous sinuses contained pus, and the thrombosis extended into the sigmoid, which contained disintegrated clot, which was purulent near the jugular bulb. On the right in the Sylvian fissure the vessels were thrombosed and purulent and there was a purulent exudate on the anterior aspect of the cerebellum. In several cases which I have studied, establishment of collateral circulation with recovery has seemed not impossible, and I have put on record a case where left-sided symptoms, with bilateral proptophthalmos, made probable a diagnosis of thrombosis or at least phlebitis of the cavernous sinuses. Both optic nerves became atrophic, yet the child recovered and some sight has been regained.

Middle-ear Suppuration. Charles Heath,³ cited last year as reporting 400 radical operations for the cure of chronic middle-ear suppuration, has also greatly modified his work and gives notes of 10 cases of exenteration of the antrum without removal of drumhead or ossicles. His

¹ Laryngoscope, July and October, 1906.

² Archives of Otolaryngology, October, 1906.

³ Lancet, August 21, 1906.

results in saving and improving hearing are claimed to be brilliant, but as stated in hearing distance for various watches are not readily measurable. Suppuration had ceased in most of his cases and the perforation healed; but he regards this as of secondary importance. Open healing of the antrum, he believes, will rob the disease of its dangers and make the strictly tympanic suppuration unimportant and conquerable. One must take into consideration the author's results by the more usual methods in order to share his enthusiasm for these newer operations. Bryant's similar cases, especially the one shown April 12, in the Otological Section, New York Academy of Medicine, mark the possibilities of great advance over previous methods. The mastoid process was removed and radical exenteration done in August, 1905, incising, but leaving the drumhead with the ossicles. The dura was exposed in the middle fossa and over the sigmoid. Primary suture of the wound gave healing except at one point on the tenth day; complete healing occurred by the fifteenth. The membrane healed promptly and hearing became practically normal. It may be urged that these are not radical operations; but are they necessarily the worse for that? The most radically planned operation fails more or less in effacing *every* pneumatic cell of the temporal bone. Each succeeds or fails according to its eradication of hopelessly diseased tissues and securing lasting relief from discharge and preservation of hearing. The later involvement of the "radically cured" middle ear is a chapter to which many observers are now contributing, and Schvartze protests against the misused word, because the results are no more truly radical than the methods.

Dench¹ sums up his results with *exenteration for chronic purulent otitis media*, by citing 193 operations of which the result is known in 173, with 2 still under treatment. There were 6 deaths: 2 from pneumonia, 2 from meningitis, 1 from cerebral abscess, and 1 from cerebellar abscess with sarcoma—in no case ascribable to the operation. The cures were 131 (75 per cent.)—in the last 95 cases 80 per cent. were cured—and 29 additional cases had but a slight discharge. But 4 of the late cases had facial palsy and all sooner or later recovered. He warns as to the need of occasional clearing out of the epithelial debris, which is apt to complicate even the successful cases and cause momentary moisture. Hearing has generally been uninjured if not improved. Where it is only a whisper at three or four feet, it is more often benefited by operation. He strongly advocates skin grafting in addition to the primary plastic operation, and prefers to pack the posterior wound for from five to ten days until granulations cover the cavity wall, and then to apply Thiersch grafts and close the posterior opening.

The Mastoid. In a paper on the "Technique in the After-care of the Radical Mastoid Operation," Philip Hammond presented, at the Boston

¹ Laryngoscope, October, 1906.

meeting of the American Medical Association,¹ a clear and consistent picture of his method, with one large secondary Thiersch graft. This he applies under general anesthesia ten to twelve days after an elaborate and smooth exenteration which had been meanwhile packed with numerous small squares of iodoform gauze. Every trace of packing, clot, etc., is removed. A thin graft, perhaps two by three inches, is then cut from the thigh with a very sharp amputating knife, is then covered with *peau de soie*, lifted in contact with it, and placed on a plug of lightly wound gauze and carried into the meatus. The centre is placed in the antrum and the rest smoothed out as perfectly as possible and held by the light packing. Portions necrose and come away from the creases; but in five to seven weeks full healing with thin, smooth dermatization is usually complete. Several operators urge the tamponing of the uncut canal, stretching its tissues back into opened mastoid cavities, claiming for this method prompt and good results, beyond my belief.

Tuberculous disease of the mastoid in children was reported in 5 more cases by Henrici to the German Otological Society, which, combined with 8 cases previously published, show that in his experience nearly one-sixth of the mastoid cases in children are tuberculous. He regards them as primary and not transmitted from the tympanum, as could be proven in 3 cases free from disease in the tympanum and upper air passages. Healing was apt to be slow but satisfactory. Kobrak reported an apparently isolated mastoid tuberculosis, but after death from an intracurrent disease old tympanic lesions were found.

A curious group of early cases of *temporal necrosis* was reported as the result of notes which I² presented at the American Otological Society detailing 2 cases occurring shortly after birth. In 1 the trouble was nearly confined to the zygoma, which was removed as black sequestra within seven weeks after an easy, unaided birth. In the second, extensive destruction of the inner table as well as of the mastoid process was found in an infant showing otorrhea five days, and mastoid swelling ten days, after birth. The first case comes under a class of caries of the anterior portion of the temporal bone which was unusually frequent last spring. Dr. Whiting cited 5 cases in earliest infancy, one child of ten days presenting disintegration of the temporal muscle as well as of much of the bone and a fistula out through the parotid and one back to the occiput. This weakened, puny baby recovered, but succumbed the following year.

Among 135 cases dying from *temporal bone disease* at the Leeds Infirmary in the past fifteen years, Whitehead³ notes 22 cases of acute miliary tuberculosis, in 14 of which the temporal bone seemed the primary focus. The meninges were affected in 18 cases, but in none could

¹ Jour. Amer. Med. Assoc., November 17, 1906.

² Trans. Amer. Otological Soc., 1906, p. 406

³ Archives of Otolaryngology, October, 1906.

the operation be regarded as having disseminated the disease. Nineteen cases were under two years of age.

Hubbard¹ discusses the relation of diabetes and nephritis to *suppurative osteomyelitis of the temporal bone* and details the symptoms which are common to both groups of cases. He advocates all possible conservatism in preparing these patients before operation, as well as striving to bring them through without it. He reports a series of cases illustrating the value of such methods and has rarely had to operate. He quotes Eulenstein's late paper, collecting 67 cases with 12 operations, 8 of which were successful. While I admit that the risk of the disease as well as of the operation is greater than with healthy patients, we must generally accept the conclusion that "the course of suppuration of the middle ear and temporal bone in diabetes presents in the great majority of cases nothing characteristic."

TRANSILLUMINATION OF THE MASTOID is warmly advocated by A. H. Andrews, of Chicago, who uses in the opaque hood a twelve-candle-power electric lamp with a five-sixteenths inch opening over the mastoid. The examination is made through a speculum directed to the back wall of the canal, and in this way Andrews frequently finds decisive evidence of unilateral opacity in cases of mastoid disease. While some of these clear up promptly, he claims never to have cured a chronic aural discharge by medicinal means when the mastoid gave this evidence of involvement.

THE BLOOD-CLOT DRESSING IN MASTOID OPERATIONS. This subject, which has formerly had Blake as its aural exponent, has recently been discussed pro and con by others, some of them denouncing it, others advocating its use. Sprague, who seems to have inaugurated its use in mastoid surgery, and Reik, who is a collaborator with Blake in an admirable new text-book, presented the matter most favorably at the New York meeting of the American Otological Society. Bryant went farther than most supporters of the method, using it even in exenteration cases where he has preserved the drumhead and ossicles; and with Sprague he combined it with drainage by a wick, in those cases in which the lateral sinus had been packed. Despite the adverse reports of Dench, Jack, and others, many were favorably impressed by the claims for the procedure, and I feel sure that as I use it more I shall obtain more frequently the good results I have sometimes gained in the past. Prime union of a mastoid wound with cure within two weeks is well worth striving for, especially if we can verify the contention of its supporters that failures by this method are often more successful than the most favorable results obtained by packing. Jack, however, cited 60 cases from the records of the Massachusetts Eye and Ear Infirmary, 10 cases of his own and the rest done by his colleagues, of which but 4 had

¹ Laryngoscope, July, 1906.

primary union and in 2 only of these was there no persistent tympanic discharge. The time of treatment did not appear shortened, and he is inclined to think the hearing was less fully recovered. Sprague's success quoted last year, of 27 cases cured in two weeks or less, 78 in three, and 104 in four weeks or less, certainly justifies his advocacy. In his later summary he states that of 186 acute cases 64 per cent. were considered suitable for the blood-clot dressing, 10 per cent. more were modified by a drain. Of these typical cases some 68 were healed in seven to fifteen days and the remaining 32, while not fully successful, were healed in eighteen days or less. He reports similar satisfactory results with the Scheibe method in a case of fibroma of the lobule, and I can cite a similar success.

Reik reports, from his last 100 mastoid operations, 43 acute and 10 chronic cases closed with a blood clot, of which 31 acute and 5 chronic cases gave primary union; only 14 became infected and broke down. Bryant cites 23 radical exenterations done in the past year, of which but 3 broke down, and these did not seem delayed in their healing, although he did no primary nor secondary plastic work. I have made increasing use of the method, with some splendid results in cases far from ideal in their promise. I employed my usual plastic flaps and a cigarette drain, obtaining prime posterior union as usual and speedier dermatization within.

The Value of the X-ray in Diagnosis of Aural Disease as well as the treatment of epithelioma, etc., has been recently brought forward by Pfahler, Pancoast, and others, but the note of caution sounded by Edsall¹ deserves careful weighing, since profound metabolic changes for good or ill may follow its employment. In discussing Edsall's paper E. J. Brown, of Decatur, Ill., cited a patient with a small epithelioma of the nasal ala which was apparently cured after eight to ten exposures, but he suffered general ophthalmoplegia, with trismus and paralysis of branches of the fifth nerve. Chronic suppurative otitis was present, but no connection with this appeared. Details of the mastoid cells are often well shown, as of the nasal accessory cavities, and diseased areas may be fairly defined. In a recent case of my own Dr. Pancoast fairly defined and located a hyperostosis closing the auditory meatus in which it was not clinically possible to decide before operation from which wall the outgrowth came.

Bier's Induced Hyperemia in Ear Diseases. The application of passive congestion to the treatment of middle-ear inflammations has led to some remarkable reports abroad and an excellent summary and notes of personal experience by S. J. Kopetzky,² of the Manhattan Hospital. He cites the reports from Bier's clinic in Bonn, by Kepler; from Lucae's

¹ Jour. Amer. Med. Assoc., November 3, 1906.

² Arch. f. Ohrenhkl., August, 1906.

clinic, by Heine; 12 cases from Schwartz's clinic, by Isemer, and the papers of Stenger and Colley, and 8 cases of his own—some 60 in all. Of these a number were by subsequent operation shown to be impossible of prompt cure by any non-operative method, because of sequestrum, cholesteatoma, or other such chronic lesions. Others gave partially satisfactory results and were thought to recover with exceptional promptness. A still larger group, principally of acute purulent inflammations, many with marked mastoid involvement, are described as undergoing resolution with a rapidity little short of marvelous, and reaching a cure that was as complete and lasting as it was prompt. While the cases often received the rest in bed, hot douching, free drum-head incision, and the care under which I expect 5 out of 6 similar cases recover in spite of threat of mastoid abscess, the quick change and especially the comfort following the hyperemia seem remarkable. Kopetzky not only applied the constricting band around the neck, but raised the foot of the bed and kept tightening the band as its elasticity lessened, and maintained it generally twenty-two hours of the twenty-four. Slight cyanosis of the face was maintained. The swollen mastoid generally becomes more edematous and should feel warm to the touch. The band is loosened to permit of free swallowing, but patients are said sometimes to beg for its tightening because of the relief to pain in the affected regions. If fluctuation occurs over the mastoid many observers cut down to the bone, and simply puncture to evacuate the purulent collection; others who employ the method in their operative cases open up the bone and then secure hyperemia either by the constricting neck-band or by a suction cup locally applied. Some would bar out all cardiac, renal, and arteriosclerotic cases; others those with adenoids and enlargement of the tonsils; some find even these cases do well. Antibacterial action of the increased serum at the invaded point, irrespective of the germs found, is the theory offered by Kopetzky to explain the results. The experiments of Colley support this view and suggest hypernormal activity of the fluid.

When one has believed for years, as I have, in derivative measures, the avoidance of congestion and the dangers of stasis, these claims are certainly revolutionary. Only the assurance, by competent observers, that pain, fever, and discharge are favorably influenced with exceptional promptness calls for conscientious testing of the method. The warnings which have been given to limit its application to acute, mildly infective cases in young, otherwise healthy patients, and under the observation of an expert ready to operate without further loss of time, must be rigidly regarded or we will have more harm than possible good resulting. Suspicion of intracranial extension should interdict its use, for those cases requiring operation have given evidence hardly to be doubted that serious advance of the disease has been caused rather than lessened by the hyperemia, while valuable time has been lost.

Theobald¹ returns to the benefits of constitutional treatment in controlling mastoid inflammation, and reports a striking illustration of its efficacy. A girl, aged five years, had acute tympanic suppuration five weeks, when mastoid trouble appeared and grew worse for four days. Operation was advised, but as the flow was free and her general condition good, she was given *sodium pyrophosphate* in 10-grain dose every third hour, with a purgative and bichloride douchings. Improvement was marked the next day, suppuration ceased in five days, all mastoid swelling vanished, and in two weeks hearing and appearances were practically normal.

Aspiration of the Middle Ear, after incision of the drumhead in *acute middle-ear suppuration* was strongly urged by Percy Friedenbergl at the meeting of the American Academy of Ophthalmology and Otolaryngology. He employs a sterilized glass tube inserted into the auditory canal, which often brings out a dram or more of bloody or purulent fluid when otherwise only a drop or two might be immediately evacuated. In six years' experience he has had only good results and believes that the best possible flushing of the middle-ear is thus obtained, as a freer flow is set up with elimination of infective material and a maintenance of the opening. Repeated paracentesis is rarely needed. As an increasing recognition of the saving influence of paracentesis is one of the greatest advances of modern otology, any steps which increase its effectiveness are greatly to be welcomed.

Catarrhal Deafness. **MASSAGE OF THE TYMPANUM BY A COLUMN OF MERCURY.** Beck² commends massage of the tympanum by a column of mercury flowing in and out of the ear from a cone-mouthed test-tube fitting tight in the meatus. Two ounces of metallic mercury will about one-third fill the tube, and there is, consequently, free movement and even vigorous impact. He heats the metal to 180° F., then cools until bearable and looks for value from the heat and "nascent mercury" as well as the massage. Others having employed the apparatus report some encouragement, especially in the relief of tinnitus.

DISEASED CONDITIONS OF THE ROSENMÜLLER FOSSA. The importance of diseased conditions of the Rosenmüller fossa in the causation of tinnitus and other ear troubles was set forth long ago, by Harrison Allen and later by Robert C. Myles.³ This year a number of men, more or less independently, have urged its importance and cite a long series of cases, often brilliant in their results, from simple clearing up of these fossæ. Brunk⁴ reports five years' work in divulsing adhesive bands with the finger-tips and curetting away granulation tissue, with relief of multiform ear and throat symptoms. He regards unhealthy conditions here as determining suppurative middle-ear troubles as well as

¹ Amer. Otological Society, 1906.

³ Trans. American Otological Society, 1897.

² Laryngoscope.

⁴ Laryngoscope, August, 1906.

functional disturbances. Jervy's claims were made principally in regard to tinnitus. He credits Pynchon especially as having called attention to the matter.

THE FAUCIAL TONSILS AND CATARRHAL DEAFNESS. Myles¹ has also laid stress upon the importance of the deep-seated upper portion of the faucial tonsils in their adverse influence upon catarrhal deafness. Recognizing some cases as defying all our efforts, he yet urged greater attention to this as one of the essential details of getting the upper air passages into good condition. Under the topical and interstitial use of cocaine, he turns down the tonsil from above and removes with the guillotine.

VIBRATION CATHETERIZATION WITH CARBONIC OXIDE GAS. Warnecke² describes his elaborated apparatus for vibration catheterization with carbonic oxide gas, which warms and expands the gas coming from the cylinder as desired, and by a turbine interrupts, up to 200 times per second, the current. He uses the uninterrupted current at three to five pounds' pressure, but with the interruptions can employ twenty to thirty pounds. The vibration stream has almost wholly displaced the continuous in his practice, and he prefers the carbonic oxide as causing greater hyperemia of the tympanic lining and favoring absorption and improvement beyond any other means known to him. I have not tested the apparatus, having been fairly content with the improved results from injections of dionin which I have substituted for some months for almost all other intratympanic remedies. It has seemed to clear the Eustachian tube quite as well as the bougie, and many obstinate cases show gratifying gain under its use.

Herpes Zoster Auris. A good illustration of the rare herpes zoster auris with an excellent discussion of this threatening condition is given by Vail,³ whose patient had agonizing mastoid pain and tenderness unrelieved by morphine or incision of the drumhead. The pain being, as usual, antecedent to the visible lesions, a disquieting period of uncertainty has to be passed before the diagnosis can be made. Vail does not mention the value of full doses of quinine which have seemed to me of distinct value in this as in the ophthalmic form. Three of my five cases were simultaneous, a husband and wife making two of the sufferers—a point of some importance as bearing on the climatic or on the contagious possibilities of the infection. All data seem to point to ganglion involvement; but Vail also calls attention to the frequency of lymphadenitis of the region.

Oto-projectoscope. Under the name oto-projectoscope, Goldstein⁴ describes his apparatus for throwing upon a screen the enlarged image of the drumhead and meatus, and claims full success in thus placing before a group of students all the details obtainable by the individual

¹ Trans. Amer. Otological Society, 1906, p. 404.

² Arch. f. Ohrenhkl., July, 1906, lxviii, 3.

³ Laryngoscope, September, 1906.

⁴ Laryngoscope.

in the usual examination. The rays of an arc light cooled by an alum tank are so concentrated upon the fundus that it furnishes, as in other epidiascopes, a sufficiently brilliant image to be projected upon a screen at some distance. The instrument is readily adapted to throw projections of other objects and pictures, and in its clinical employment should be of great use to the teacher. Valuable photographs may be thus taken of drumhead conditions; although this side of the work may prove less satisfactory than the author's zeal depicts it. If others can obtain such results, the innovation bids fair to secure general utilization.

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